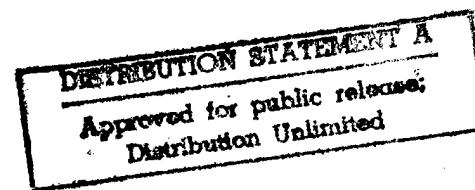


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JPRS-UTR-84-002

3 February 1984



# USSR Report

## TRANSPORTATION

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3 February 1984

USSR REPORT  
TRANSPORTATION

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## MOTOR VEHICLES AND HIGHWAYS

### TESTING REVEALS PROBLEMS WITH NEW LIAZ-5256 BUS

Moscow LENINSKOYE ZNAMYA in Russian 28 Jun 83 p 2

[Article by LENINSKOYE ZNAMYA correspondent V. Bebko: "A Bus Takes an Examination"]

[Text] The first two of the latest LiAZ-5256 buses made their appearance on the streets of Moscow over a year ago now. They are products of the All-Union Experimental Design Institute of Bus Building in L'vov and the mechanical engineers at Likino. What are the results of this period of operational testing?

Journalists were among the first passengers to ride on the new bus. They came away full of praise for the new vehicle. And it was no unthinking praise. It was well-deserved. Decisions of the 26th CPSU Congress call for more extensive use of diesel engines in the bus-building industry. Dieselization helps reduce the emission into the atmosphere of toxic exhaust gases harmful to man and cuts fuel consumption some 30-35 per cent. The new city bus is in fact equipped with a diesel engine mounted in the rear of the body. Let's think back a little. In the LiAZ-677 the engine was located next to the driver. The man behind the wheel finds it very annoying to have it so close. He has to put up with more air pollution with it up there, plus the fact that it generates a lot of extra heat, particularly in the summer. So operating conditions for the driver have been improved on the new bus. A similar design change now has three wide doors in the passenger compartment. So it's now more convenient for the passengers, too.

The nature of the work a driver must perform along a city route is such that he must make frequent stops, go through an endless series of changes in speed and make sharp turns. So the designers have taken this into account. They have put as many control knobs and levers as possible on the steering column. It is accordingly the unanimous opinion of the test drivers that it is much easier to drive the new bus than the LiAZ-677. The new bus is more maneuverable. It has good acceleration and an improved brake system.

What a bus looks like is of no little importance as well. The new machine is an elegant-looking vehicle which without doubt will add to the appearance of our city and its roads. Its broad side windows give it an attractive look. The plastic-finished passenger compartment is roomier than before, what with the fact that it has been extended by almost a meter. The old LiAZ has 25 seats, while the new one has 27. Seating capacity has accordingly been increased from 110 to 120 passengers.

"The LiAZ-677 is out of date," says N. Kulikov, chief designer at the Likino Bus Works. "It was designed 20 years ago now. So what we need to do now is not to improve the old model, but rather to develop an entirely new one taking into account the increasing demand for safety, economy and comfort...."

Is this what we've got in the LiAZ-5256? It's too early for any definitive analysis. Tests of the first LiAZ-5256 models are still under way. Operators who have test-driven the new machine, however, have already developed a very definite opinion. This can't be ignored. The capital's bus fleet No. 5 has undertaken a most detailed analysis of the tests. What does it show? The tests here involved two buses operating on the fairly heavily traveled and difficult route No. 6. One of them traveled 40, the other 45,000 kilometers. They spent one-third of the total time available for route operations in for maintenance. So now let's compare. The predecessor of the new machine, the LiAZ-677, stands idle in the park one-tenth of this time, the Ikarus-280 articulated bus 15 per cent. So, while the LiAZ-677 covers an average of as many as 7000 kilometers per month, the LiAZ-5256 will be running only 4-5000.

One of the machine's main deficiencies is that there is an extremely short distance between the lowest point of the bus and the road—260 millimeters, which is 80 millimeters less than in the case of the LiAZ-677. It can't be assigned just any route, even on the well-maintained thoroughfares of the capital. What kind of machine is this, when a dispatcher has always to be racking his brains over where in fact he can send it? The streets on this route have pot holes, then there's a railroad crossing over here. It can't be assigned any chartered routes because you never know what roads it'll have to take.

The rear of the bus has only a small angle of overhang, which on bad roads can lead to damage to the engine crankcase. Near the rear doors in the passenger compartment, moreover, there is a large passenger assembly area. Overloading in this area over the course of 30-40,000 kilometers is going to damage some of the structural elements of the body. The designers have, it is true, already taken this deficiency into consideration. A new bus with a stronger body has now arrived at the NAMI [Order of the Red Banner of Labor Central Scientific Institute of Motor Vehicle and Motor Vehicle Engine Research] test area near Dmitrov. But even if these tests are a success, the bus people are still going to have their doubts about the results. They think a bus should be driven under normal conditions over city routes for at least 200-300,000 kilometers—only then will it be possible to make any judgement about the strength of the body. At the present time, however, neither the people in Moscow nor the Likino Bus Works (LiAZ) have a single LiAZ-5256 which could exceed 100,000 kilometers.

The experts who evaluated these machines found two dozen other deficiencies as well. The rear bumper, for example, is close to the engine, which would be very vulnerable in a traffic accident. The batteries, which have been mounted next to the engine, go bad quickly because of the high temperatures. They should be moved out of the engine compartment. The drivers aren't happy with the way the operator's position has been laid out. The arrangement of the seats does not permit uniform load distribution during peak hours, so the bus tilts to the right. The operator's position stays cold, and the heating system for the passenger compartment isn't entirely effective either. The engine does not reach optimum engine heat levels in freezing weather (at temperatures of -20 and below), which results

in increased fuel consumption. Even in the summer, however, the bus "guzzles" more fuel over a distance of 100 kilometers than does the roomier articulated Ikarus-280.

It would be appropriate at this point to take a closer look at the engine for the LiAZ-5256. N. Kulikov, the Likino plant's chief designer, particularly stressed in his conversation with me the fact that in designing this new machine they had taken international standards and the practical experience of foreign firms into account. The problem, though, is that many foreign buses are powered by engines designed especially for them. Designers here, however, have once again jammed a truck engine in the LiAZ-5256, this time one from the KamAZ. So much for your international standards. The truck driver can easily tilt his cab to gain access to the engine. On the new bus, however, he can get a good look at only one side of the engine. The special-purpose bus engines, moreover, are more compact, while the one from the KamAZ takes up a lot of space. To accommodate the engine, designers had to build in a high step in the rear of the bus and then install seats along the entire wall on top of it. Test drivers get a big kick out this: "If you have to brake suddenly or turn the bus at any substantial speed, the passengers sitting up there on those seats are going to come tumbling right down. You really ought hang a sign up there saying 'For men only.' Because it's hard for women to climb up there and find a really comfortable seat." The bus-manufacturers themselves, incidentally, are not raising the question of developing a special engine for the new bus. When I touched on the subject, V. Shatskov, deputy chief designer for LiAZ, declared with some conviction: "No, industry is not going to make any special engines for us. Ten thousand units a year's not much. This is really small-scale production. Nobody's going to agree to it." The problem, though, is that we're probably going to need to take a different approach to the development of new equipment and to the exploitation of the advances of the scientific-technical revolution. This very question was among the issues discussed at the June (1983) CPSU Central Committee plenum.

"Did you ever stop to think about why many years ago the construction industry began to make window frames without any of the little hinged panes? To the unthinking or the ill-informed it was simply a sign of a change in trend. But it then became clear that this innovation had been contrived in the interest of the construction industry itself but to the disadvantage of the people who were going to be moving into the new residences where these windows were being installed. We can see something of the sort at work here in the case of the new model of bus. It seemed as though the designers wanted to strive all at the same time for comfort, aesthetic appeal, reductions in metal consumption and the best possible link between the production engineering involved in manufacturing both the old and the new models. A multitude of tasks were involved here. It is clear, however, that not all of them have been done well. On one hand, for example, they tried not to depart too far from the overall dimensions of the old model; on the other, however, in order to satisfy the bus people, they decided not to clutter up the additional space in the passenger compartment with a lot of new seats. Are the passengers going to like this? Three-fourths of the passengers the bus picks up on the busy routes during rush hour are going to have to ride standing up. But then if you have to send a machine out to haul children or passengers, its going to be dispatched virtually empty because there won't be enough seats. So the bus is going to need a number of modifications to suit it to different routes and different transport conditions. The people at Likino aren't doing a very good job of this with the old LiAZ-677. Are they about to get the job done

on the new machine? N. Kulikov, the plant's chief designer, declares convincingly in reply that 'the new bus has been designed for the average passenger. We can only sympathize with the ones who are going to have to ride standing up.'"

As people at LiAZ point out, the human engineering experts have given the new bus positive reviews. But they and the designers have overlooked something. All right, so we can't get rid of the high ledge with the rear seats on it at this point. But then there's the matter of the steps in the passenger compartment. It is the view of the bus people that the design of the second step is faulty. It is not a full step; it is cut short around the edges of the doorway leaving deep gaps. Passengers have occasionally stumbled in exiting the bus. The thing is that this step is necessary only in order to provide a place for the door to fold into around the edge of the doorway when it opens. These are not quadruple-, but rather wide double-folding doors set with glass almost from top to bottom. They look nice, but they promise trouble for passengers. One of the panels of the front door, for example, has a moving handrail. If a child were to get behind it the rail would mash it when the door opened. The handrail on the other door presents no dangers, but if a passenger grasps it near the wall, the door will bang his hand when it opens. Then there's something else. Round doorstops extend from the bottom. Test drivers report that ice will form quickly around these stops in the wintertime and that passengers can slip on them. There would perhaps be time to get instructions posted informing passengers of the proper precautions to take when riding the new bus.

The LiAZ people call the new bus a "brother" of the Ikarus. It is a member of a family of standardized large-capacity city buses made in the Hungarian People's Republic. Hungary will also be providing some of the component assemblies for it. Plans also call for closer collaboration between LiAZ and the Hungarian bus builders, specifically, the Hungarians are going to help ready the plant for assembly-line production of the new bus. S. Virych, however, head of the production engineering department of the Glavmosgortrans bus administration and an expert in this area, clearly does not want to establish any kinship like this between the new Likino bus and the Hungarian buses. In terms of the reliability and quality going into the components involved, the LiAZ-5256 is still far from measuring up to the characteristics of the machines in the Ikarus family.

Here are some other comments.

P. Kurashkin, test driver for the capital's bus fleet No. 5: "The new bus is easier to drive, but it's a lot harder to maintain it and keep it in proper operating condition."

V. Katkov, LiAZ test engineer: "The new bus, the third one in the fleet here now, is always in for maintenance or repairs. The hydromechanical gear box is not as good as the one on the LiAZ-677. City-number 87-95 bus hadn't even gone 90,000 kilometers before we had had to replace three gear boxes and an engine."

V. Pustovalov, chief of the VKEIavtobusprom [All-Union Experimental Bus-Building Design Institute] road-test laboratory: "What do you want? The tests aren't over yet. When is assembly-line production going to begin? It's hard to say. We've hit some snags with the design of the bus, problems involving parameters, engineering, materials. A lot of the component assemblies are brand new, experimental things. Soviet industry, for example, still isn't making the tires this bus uses.

Everything has to be checked very carefully. Plans now call for LiAZ to turn out 10 machines for test purposes this year and another 50 next year. We'll be putting these out on the road in different places and then we'll get back a lot more information from the test people on merits and shortcomings of this new model."

But why in the world would it be necessary to wait for the test buses to be built? We already know a lot without them. Glavmosgortrans has already forwarded complaints and comments from capital bus people to the USSR Ministry of the Automotive Industry, and lot of the people there agree with the views they contain. Senior officials of the Moscow (oblast) Motor Transport Passenger Administration hold to a similar point of view. It is their opinion that the low levels of reliability and overall roadworthiness the new model of city bus has turned in are to be explained by the fact that it wasn't the user-operators who requested its manufacture, but rather the bus manufacturers themselves, the interests and needs of the users accordingly being given inadequate consideration. This criticism pains the people at LiAZ, who denounce it as not entirely objective and well-founded.

"The bus users want our new technology and equipment all of their problems immediately," N. Kulikov, LiAZ's chief designer, told me. "They're looking at it all wrong. They want today's bus to be a cross between a tank and a limousine. But it's simply not possible for it to be both things at the same time. We've got some bad roads in this country, even in Moscow. The buses simply can't take excessive loads. We also know that the Ikarus has fewer accidents and performs more reliably solely because, as a rule, LiAZ has the most inexperienced drivers. The oblast administration recently submitted a petition which would have our plant supply it with spare bus parts over and above those called for by established norms, even taking into account the shortage of skilled drivers and the weakness of the production base. But we cannot solve the transport people's problems for them. And our new bus really isn't a bad machine. The Ministry of the Automotive Industry's interdepartmental acceptance commission, and this commission includes representatives of the RSFSR Ministry of Motor Transport, has given it an essentially positive review."

All this is true. There is no question but that the new bus has its merits and advantages. It's also necessary that we push ahead with its production. The thing is that it really ought to represent the best, that it should be a substantial step forward for our own bus-building industry. V. I. Konotop, first secretary of the CPSU's Moscow Oblast Committee, put forward the bus operators' views of the Likino machines at the 26th CPSU Congress. Then, from the platform of the congress, the minister of the automotive industry, V. N. Polyakov, gave assurances that all steps necessary would be taken to improve the quality of the Likino buses. That's been over two years ago now. So what's changed? The old LiAZ-677 is not a whit better than it was, and there have been major delays with the new machine. The RSFSR People's Control Committee recently looked into the operation of four automotive industry plants involved in the manufacture of passenger transport vehicles, including the Likino works, and recognized that this plant near Moscow, along with the three others, had fallen off the pace.

In a speech at the June (1983) CPSU Central Committee plenum, Comrade Yu. V. Andropov, general secretary of the CPSU Central Committee, declared that it was necessary to develop a program of organizational, economic and moral measures which

would give both management and labor a stake in efforts to modernize physical plant and equipment, and scientists and designers as well, of course, and make it disadvantageous to continue with business as usual. "But we have to move more quickly in this direction," Yu. V. Andropov stressed. "It's costing the country dearly to waste time here." It looks like these remarks are fully applicable to the developers of the LiAZ-5256. A lot of its shortcomings could be remedied easily; its other deficiencies are really serious things. But we need to be moving more quickly about this. The odd thing here, though, is that LiAZ's chief designer, N. Kulikov, and the works' chief engineer, V. Kononenko, are both assuring people that efforts in preparation for production of the new bus are on schedule. But they aren't anything of the kind—they've long since fallen behind the old schedule, and now they aren't able to stick with the new one either. LiAZ was to have turned out five new 5256's last year, but as things turned out it was able in the end to get only one together. And then of the ten machines scheduled for assembly this year, work is so far under way on only the first one. There was indeed a plan—to prepare for and develop capacities this year for 100 LiAZ-5256's, but the plant's chief engineer, V. Kononenko, now reports that this isn't going to happen this year and it isn't going to happen next year.

We need to step up the pace. But this still doesn't give the people who are designing and building the new bus any right to turn in deficient, slipshod performances. The new bus should indeed represent the last word in technology. It is, after all, going to be our bus of tomorrow. The June plenum of the CPSU Central Committee heard transportation and services named as industries which have fallen off the pace. If we want to narrow this down and focus in on bus transportation, a good share of the responsibility for this state of affairs will be seen to rest with the bus manufacturers. They have before them the noble objective of providing bus operators with the latest in passenger-moving equipment and helping them help put an end to the confusion and disorder in public transportation!

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## MOTOR VEHICLES AND HIGHWAYS

### FEATURES OF NEW LAZ-4202, LIAZ-5256 BUSES

Alma-Ata AVTOMOBIL'NYY TRANSPORT KAZAKHSTANA in Russian No 8, Aug 83 pp 30-31

[Article by VKEIavtobusprom engineers Yu. Vakhnyuk and S. Magdysh: "City Buses"]

[Text] Together with the L'vov and Likino bus works, the All-Union Experimental Design Institute of Bus Building has developed a series of standardized diesel buses over the past few years. It is our view that the LAZ-4202 medium city bus, the LAZ-42021 suburban bus developed on the basis of the LAZ-4202, and the large LIAZ-5256 city bus meet a great many of our present-day requirements.

All these buses have engines mounted to the rear along the body axis, a floor height of 740 mm, a KamAZ-740 diesel engine, an automatic three-speed hydromechanical transmission, spring-pneumatic or pneumatic suspension with the exception of the LAZ-4202, power steering, a pneumatic system with the new pneumatic devices being installed on the KamAZ buses, a brake system employing brake chambers with spring-actuated power accumulator and automatic regulation of the gap between brake shoe and drum, couplings for disconnecting the cooling-system fan, front and rear axle assemblies with greater load capacity, liquid heating system with automatic heater, double-folding passenger doors and forced-air ventilation and are made with advanced new materials. Plans call for them to run on low-profile radial tires.

The LAZ-4202 is now being manufactured by the L'vov Bus Works imeni 50th Anniversary of the USSR and is the first assembly line-produced medium-size diesel-powered city bus. The LAZ-42021 suburban bus is notable for its large number of seats and KamAZ speed-change box in place of the hydromechanical transmission as well as for the changes which have been made in the suspension.

The LIAZ-5256, which the Likino Bus Works is now making preparations to build, will replace the LIAZ-677 now in production.

Work is also under way in conjunction with the Ikarus plant with the objective of standardizing a number of assemblies and components used in the Ikarus with those to be incorporated in the LIAZ-5256, which will make it much easier to operate the buses supplied from the Hungarian People's Republic. These buses will have a special device designed to prevent the buses from moving while the passenger doors are open.

We would now like to present the basic specifications of the LAZ-4202 and LiAZ-5256.

Number of passenger seats - 25 and 27 respectively. Nominal passenger capacity - 69 and 90, maximum - 95 and 120. Maximum weight at nominal capacity - 13,400 and 15,500 kg. Engines - the YaMZ-7401 and KamAZ-740. Maximum power at 2600 rpm - 132 and 154.4 kW. Cooling system - liquid, closed, forced coolant circulation, KamAZ radiator with auxiliary tank and TOSOL-40 coolant.

Gear box - hydromechanical, automatic, three-speed with hydraulic retarder. Steering - automatic with controller-selected operating mode. Driving axle - two-speed with Hungarian-made final-drive gear. Gear ratio - 6.55 and 6.27. Suspension - conventional spring-pneumatic suspension on the LAZ-4202, conventional pneumatic on the LiAZ-5256. Steering - Ural-375 with power MAZ-5336 with power. Brake system - shoe brakes with individual drive, the LiAZ-5256 having V-release and automatic clearance regulation. The parking brake system consists of rear braking mechanisms and brake chambers with spring-actuated power accumulator. Control - manually operated servosystem. Emergency - one of the lines in the operating system or the parking brake system itself. Auxiliary - hydraulic retarder in hydromechanical transmission.

Maximum speed in high gear with nominal capacity - 74 and 70 km/h. Acceleration time, 0-60 km/h - LAZ-4202, 37 seconds; LiAZ-5256, 36 seconds. Outer turning radius (bumper) - 9.7 and 11.5 m respectively. The fuel tank for the LAZ-4202 is designed to hold 170 liters, while the LiAZ-5256 will carry two 150-liter tanks. Electrical system - 24 V dc. Single-lead, partially double-lead, negative terminal connected to frame. Both buses are equipped with emergency signals and emergency switch.

Both new buses meet Soviet and international design safety requirements; they are accordingly being equipped with components, devices, systems and electrical equipment which are more sophisticated than those to be found on buses currently in production.

Practical experience gained in operating the first LAZ-4202's within the motor transport enterprises indicates that motor transport enterprise personnel will require instruction prior to the arrival of the new buses.

Drivers and maintenance personnel will need to give particular attention to study of various components of the pneumatic system and the brake and electrical systems, as well as to the special features of the functioning of the diesel engine and the new hydromechanical transmission.

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## MOTOR VEHICLES AND HIGHWAYS

### DRIVER PREPAREDNESS FAULTED IN BUS ACCIDENTS

Moscow AVTOMOBIL'NYY TRANSPORT in Russian No 6, Jun 83 p 22

Article by F. Ilyukhin, engineer: "When Moments Are Decisive"

Text With every year the number of motor vehicles on our country's roads increases, and the occupation of driver has long since become one of the most common. The problem of ensuring traffic safety is also becoming increasingly urgent. As is known, about 70% of all traffic accidents are the fault of drivers, and accidents involving buses occupy a special place here, since their consequences are especially severe.

It is very important for a bus driver to know how to conduct himself in critical situations, i.e., in those moments in which seconds count. In these moments he must make the sole correct decision that will make it possible either to avoid an accident or to substantially diminish its consequences.

Despite the fact that critical situations are always extraordinary situations, and the experienced driver knows how to reduce their occurrence to a minimum, traffic conditions are such that there is no guarantee against chance accidents. This is why any driver is obligated to know how to pull his vehicle out of an unexpected skid and evacuate the passengers if his bus turns over.

A driver's lack of preparedness for such critical moments and inability to act decisively frequently result in deaths that another, more experienced driver could have avoided.

An accident that occurred on 25 September, 1982, is characteristic from this standpoint. The driver Sh. from the Oka Territorial Transport Administration was carrying passengers to Moscow for a tour on a LAZ-695 bus. On the return trip it started raining heavily. It began to grow dark, and vehicles were driving with their headlights on. At the 175th km of the Moscow-Kharkov highway, Sh. was blinded by the headlights of oncoming vehicles. Point 21.3 of the "Traffic Regulations" states: "... in the event of blinding a driver is required, without changing lanes, to reduce speed or stop and turn on his hazard signals." Instead of doing this, Sh. braked sharply. As a result, his bus skidded into the lane of oncoming

traffic; it hit the soft ground of the roadside, turned over several times and landed on its wheels (see photo) /photo not reproduced/.

Eight persons were killed and 23 received severe bodily injuries in this accident. It occurred because the driver was unprepared for a critical situation. Moreover, he had attached no importance to the fact that it was raining heavily and he had to cover a difficult segment of highway (a 1.4 km downgrade, with a 5.5 meter roadbed embankment). At the start of the downgrade, there were traffic signs 1.13, "Steep Descent," and 3.24, "Limit Speed" to 70 km/hr.

Driving skill and the careful selection of drivers are important factors in improving traffic safety. However, these matters by no means receive the proper attention at all motor transport enterprises. Because of a negligent attitude on the part of motor transport enterprises' executives, inexperienced drivers whose training is far from the best sometimes take the wheels of buses. Because of this, critical situations and, as a result, traffic accidents with severe consequences, occur. Both the executives of motor transport enterprises and bus drivers should remember their responsibility for passengers' lives.

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## RAIL SYSTEMS

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### IMPROVED HOPPER CAR DESIGN INCREASES GRAIN-CARRYING CAPACITY

Moscow ZHELEZNODOROZHNYY TRANSPORT in Russian No 8, Aug 83 pp 35-36

[Article by V. V. Bokach, Yu. Ya. Vodyannikov, V. I. Prikhod'ko, M. V. Trotskiy and A. V. Shvets, engineers and V. A. Tsarapkin, candidate of technical sciences: "Increasing Grain Car Capacity"]

[Text] We are now continuously adding new special-purpose hopper cars whose use is yielding substantial benefits from the engineering economic point of view; it helps achieve higher levels of mechanization, speeds up loading and unloading operations, improves the treatment cargo receives during handling and creates better health conditions for operations personnel. An important step now to be taken in the direction of increasing the efficiency with which we utilize these special-purpose hoppers is to expand the nomenclature we use to designate the loads they carry which are similar in terms of characteristics and designation. An example of what we are talking about might be a hopper designed to carry grain, raw materials and products of the mixed feed and food industries on the hand, and on the other a car for carrying mineral fertilizer.

As practical experience has shown, however, because of the fact that cargoes comprising each group have different bulk densities, we will in a number of instances find an underutilization of a car's effective carrying volume or capacity, and this will in turn result in declines in such basic indicators as rail loading per axle and load per running meter of track.

One possible way to achieve fuller utilization of carrying capacity is to increase the geometric volume of the car body. This, however, would entail increases in tare weight, the use of more metal, increased labor inputs in car fabrication and maintenance operations, the development of new special-purpose equipment etc. Studies conducted jointly by the All-Union Scientific Research Institute of Car Building and the Kryukovskiy Car-Building Works show that it will be possible in a number of instances to achieve some increases in effective load capacity by making better use of the body capacities of existing cars.

Car capacity, as we know, is a function of the dimensions and design of the body and loading hatches and of the physical-mechanical characteristics of the load. As a car is loaded, an irregularly shaped body takes shape in conformity with the geometrical configuration of the body of the car, the formation of the free surface of which is governed by the design of the loading hatches and the angles

of rest of the load. Designs for rolling stock on both Soviet and foreign railroads incorporate basically three types of loading hatches for gravitation loading: circular, rectangular and slot hatches running the entire length of the roof. Taking as an example a grain car built by the Kryukovskiy Car Works, let us now look at the efficiencies offered by these types of loading hatches.

Table 1

Parameter	Car Model Parameter Values	
	11-739	19-752
Capacity, t	65	70
Tare weight, t	22	22
Tare factor	0.338	0.314
Track loading per wheel pair, kN (ton-force)	213 (21.75)	225.5 (23.0)
Linear load, kN/m (ton-force/m)	57.86 (5.9)	61.3 (6.25)
Body volume, m <sup>3</sup>	93	94

The first model of this car (11-739), which was built from 1976 up through 1982, has four circular loading hatches with inside diameters of 576 mm and a distance between the axes of the center and outside hatches of 3851 mm and between those of the two center hatches of 1800 mm. The total length of the four hatches along the longitudinal axis of the car is 2304 mm, or 21.4 per cent of the internal length of the roof. Practical experience with the operation of this car has demonstrated that in the case of for practical purposes full utilization of its specification capacity, no more than 90 per cent of the geometrical volume of the car is being used with an axial load of 214.7 kN. This means that some 10 m<sup>3</sup> of the geometric volume of the body remains unused in each car.

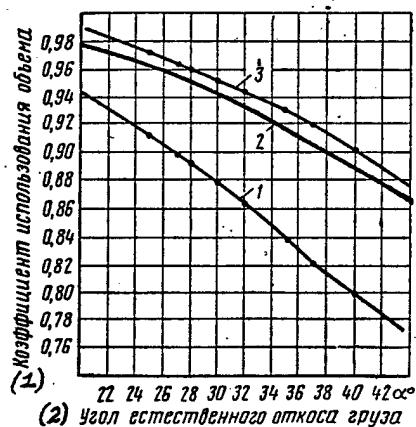
Table 2

Наименование груза (1)	Масса груза, т (2)		Использование объема кузова, % (3)		Фактическая нагрузка от колесной пары на рельсы, кН (4)	
	11-739	19-752	11-739	19-752	11-739	19-752
Пшеница (5)	67,8	73,2	91,6	97,9	219,6	232,9
Сахар-песок (6)	60,2	65,4	86,2	92,8	200,0	213,3
Сахар-сырец (7)	62,85	66,1	87,7	91,3	206,9	215,2

KEY: 1 - cargo; 2 - cargo weight, t; 3 - body volume use, %;  
4 - actual rail loading per wheel pair, kN; 5 - wheat; 6 -  
- granulated sugar; 7 - unrefined sugar.

When we go from the round loading hatches to the longitudinal (rectangular or slot) the shape of the free surface of the load in the car changes from a cone to an ellipse. Calculations show that this change makes it possible to increase

the coefficient of volume utilization and, accordingly, the load-carrying capacity of the body by 6-12 per cent without altering its dimensions depending upon the size of the angle of rest of the load to be transported. It has also been shown that the greatest increase in capacity, 87.5 per cent of the possible (computed) increase, is achieved when the overall length of the loading hatches reaches 60 per cent of the internal length of the roof. If the car has a single, continuous slot loading hatch, the capacity of the body can be increased another 12.5 per cent.



KEY: 1 - volume utilization factor; 2 - angle of rest of cargo.

of cargoes (Table 2). The Kryukovskiy Car Works began series production of these cars in 1982.

With reference to the design and geometrical dimensions of the bodies and loading hatches of the model 11-739 and 19-752 cars, the figure above illustrates the results of an attempt to derive analytically the relationships characterizing the change in body-volume use coefficient as a function of the angle of rest of the cargo. Line 1 on the graph reflects this relationship for the 11-739 with round hatches, line 2 for the 19-752 with rectangular hatches while line 3 shows the maximum of the coefficient (reached with the single continuous slot).

These relationships can be employed in analyzing the efficiency with which grain cars can be used to transport bulk cargoes having different angles of rest. To estimate actual car capacity, we multiply the coefficient, whose value we find from the known angle of rest of the particular load involved, by the volume of the body (93 or 94 m<sup>3</sup>) and the bulk density of the load. The graph encompasses the nomenclature of virtually all loads carried in this type of car, from wheat, with an angle of rest of 25°, to bran, which has an angle of rest of 40°.

On the basis of the results of calculations and operational tests it has thus been established that the cargo-carrying capacity of a car with rectangular loading

The results of these computations have been taken into account in designing the new improved model 19-752 grain car. It differs from the previous model in having a roof with four rectangular loading hatches with inside diameters of 1592x562 mm. Table 1 gives the basic parameters of the 11-739 and 19-752 model cars.

As can be seen from Table 1, the changeover from circular to rectangular loading hatches has made it possible to achieve a 5-ton increase in effective car capacity without, for all practical purposes, making any changes in the volume of the body. Comparison operational tests of the model 11-739 and 19-752 cars have confirmed the results of calculations and the advantage to be derived from using rectangular instead of round hatches in transporting a variety

of cargoes (Table 2).

The Kryukovskiy Car Works began series production of these cars in 1982.

With reference to the design and geometrical dimensions of the bodies and loading hatches of the model 11-739 and 19-752 cars, the figure above illustrates the results of an attempt to derive analytically the relationships characterizing the change in body-volume use coefficient as a function of the angle of rest of the cargo. Line 1 on the graph reflects this relationship for the 11-739 with round hatches, line 2 for the 19-752 with rectangular hatches while line 3 shows the maximum of the coefficient (reached with the single continuous slot).

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On the basis of the results of calculations and operational tests it has thus been established that the cargo-carrying capacity of a car with rectangular loading

hatches ranges from 2.1 to 8.3 tons greater than that of a car with circular hatches for the current range of cargoes. The economic gain to be derived from bringing this new car model into service is figuring out at roughly 1260 rubles per car per year.

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CSO: 1829/38

## RAIL SYSTEMS

UDC 624.191.94

### IMPROVED VENTILATION SYSTEM FOR METRO TUNNELS SAVES ENERGY

Moscow TRANSPORTNOYE STROITEL' STVO in Russian No 9, Sep 83 pp 19-20

*[Article by Yu. M. Rakintsev, candidate of technical sciences (VNIIZhG) /All-Union Scientific Research Institute of Railroad Hygiene/: "Selection of a Ventilation Schematic for Metro Tunnels"]*

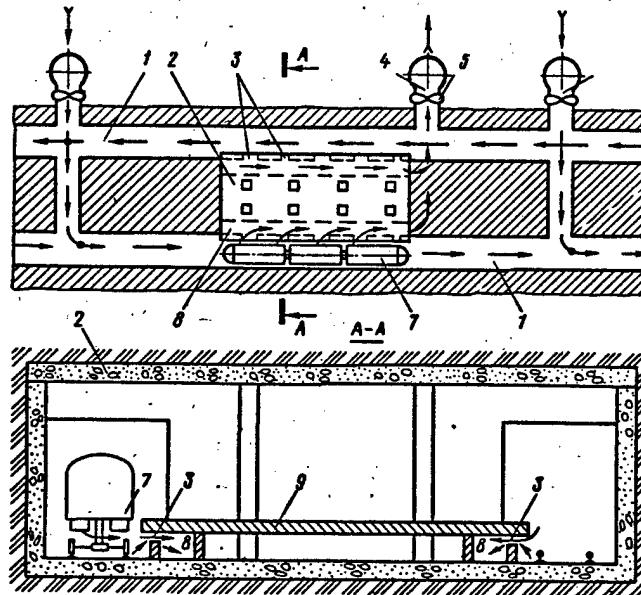
*[Text] ON ONE METRO SECTION ALONE A NEW VENTILATION SCHEMATIC LEADS TO SAVINGS OF ABOUT 180,000 kW-HRS ANNUALLY [in boldface]*

One of the responsible stages in planning metro tunnel ventilation is the selection of a schematic. Operation of a tunnel ventilation system will be most effective, from both a hygienic as well as an economic viewpoint, if the adopted schematic eliminates the spread of harmful emissions throughout the entire space to be ventilated. Thus, the selection of a schematic must begin with a study of the distribution of heat emissions along the length of the section under consideration and with respect to time.

Let us examine heat emissions in the tunnels and, above all, those of the trains. In order to estimate the uniformity of the heat emissions throughout the length of the run, we have used data from the traction tests of cars 81-717 and 81-714, as conducted on an equivalent, average-static section 1630 m in length. The weight of the car is 33 t, and the load is 90 kN /kilo-newtons/ , which corresponds to there being 125 passengers in the car.

The train begins braking at a speed of 50--60 km per hr over a length of 130 m until it stops, and this process continues for 15 sec; then the stop takes 25 sec. Practically speaking, the train brakes in the station; in our country's metros the length of the platform is 100 or 156 m. During the braking time one car emits 1.5 kW-hrs of heat energy. The maximum heat emissions occur 7--10 sec after the start of braking, when the entire train has pulled into the station, i. e., it may be considered that all the heat has been given off in the station.

The next stage is the departure of the train from the station. The length of the acceleration is 40 sec, and the track of this take-off run is 500 m long. During the time of the train's acceleration the heat emission is particularly great in the first 10 sec, when it is getting up to a speed of 25 km per hr, and while doing this, is covering only 30 m of track, moving practically all through the station. During this time 0.65 kW-hrs of heat energy is given off



The recommended ventilation schematic includes the following:

1. and 2. Run and station tunnels respectively	6. Run shaft
3. Exhaust openings of the station shaft	7. Train
4. Station shaft	8. Sub-platform ventilation channel
5. Fan	9. Platform

(per car) out of the 1.5 kW-hrs emitted during the course of the entire run. After the maximum speed of 80 km per hr is attained, the coasting begins. The coasting lasts for 50 sec, and the track length is 1000 m. During the time of the coasting 1.5--2.0 kW-hrs of energy are emitted uniformly throughout the entire length of the run. Then the process is repeated. The full amount of heat energy given off in the tunnel from one car is equal to 4.5--5.0 kW-hrs per car. Of this amount, 2.15 kW-hrs per car, i.e., 44--48 percent, is emitted directly at the platform.

Calculations of heat emission of a car with a maximum load of 250 persons per car indicate that during the braking time 2.8 kW-hrs of energy are emitted, during the time of acceleration in the first 10 sec (up to a speed of 25 km per hr) 2.3 kW-hrs are emitted out of the 6 kW-hrs of energy given off during the entire run, and during the coasting time 1.2 kW-hrs are emitted. The full amount of energy emitted into the tunnel from one car is equal to 10 kW-hrs. Of this amount, 5.1 kW-hrs, i.e., 51 percent, is emitted directly at the station platform. The amounts of energy given off from seven-car trains and passengers on various sections of the run under consideration, depending on the intensity of traffic and the load, are shown in the table below.

(1) Наполнение вагона, чел.	(2) Интенсивность движения, пар/ч	(3) Вид тепловыделения	(4) Выделение энергии, кВт·ч						
			(5) на станции (160 м)		(6) на участке разгона (470 м)		(7) на участке выбега (1000 м)		
			Σ	на 1 м	Σ	на 1 м	Σ	на 1 м	
250	45	(1) От поездов из семи вагонов	3200	19,5	2300	4,95	760	0,76	
		(2) От пассажиров на платформе (200 чел.)	23,4	0,15	—	—	—	—	
		(3) От пассажиров в поезде, стоящем на платформе	153	0,98	—	—	—	—	
		(4) От пассажиров в движущемся поезде	53	0,33	156	0,33	330	0,33	
(5) Суммарные тепловыделения $Z_1$			3429,4	20,9	2456 1228	5,28 2,64	1090 545	1,09 0,55	
125	24	(6) От поездов из семи вагонов	725	4,55	286	0,61	590	0,59	
		(7) От пассажиров на платформе (80 чел.)	9,3	0,06	—	—	—	—	
		(8) От пассажиров в поезде, стоящем на платформе	27,2	0,18	—	—	—	—	
		(9) От пассажиров в движущемся поезде	14,0	0,09	42,5	0,09	90	0,09	
(10) Суммарное тепловыделение $Z_2$			775,5	4,88	328,5 164,3	0,7 0,35	680 340	0,68 0,34	
(11) От освещения станций и перегонных тоннелей			110	0,6	2,5	—	5	—	
(12) От стационарного энергетического и вентиляционного оборудования, работающего на приток			60	—	—	—	60	—	
(13) Сумма всех тепловыделений $Z$			150	0,6	2,5	—	65	—	
250	45	$Z_1 + Z$	3579,4	21,5	2458,5 1229	5,28 2,64	1155 578	1,09 0,55	
125	24	$Z_2 + Z$	925,5	5,48	331 166	0,7 0,35	745 373	0,68 0,34	

Примечание. В числителе приведены тепловыделения в двух параллельных тоннелях расчетного участка, в знаменателе — в одном тоннеле.

Key:

1. No. of persons in car
2. Traffic intensity, in sets per hr
3. Type of heat emission
4. Energy emitted, in kW-hrs
5. At the station (160 m)
6. On the acceleration section (470 m)
7. On the coasting section (1000 m)
8. Per m
9. Per m
10. Per m
11. From seven-car trains
12. From passengers on the platform (200 persons)
13. From passengers on a train standing at the platform
14. From passengers in a moving train
15. Total heat emissions  $Z_1$
16. From seven-car trains
17. From passengers on the platform (80 persons)
18. From passengers on a train standing at the platform
19. From passengers in a moving train
20. Total heat emission  $Z_2$
21. From station and run tunnel lighting
22. From station power and ventilation equipment operating on current
23. Total of heat emissions  $Z$

Note. The numerator cites heat emissions in two parallel tunnels of the section under consideration, while the denominator cites those in one tunnel.

Comparison of the total heat emissions per m on the sections of the run under consideration shows that, when the car is filled with 250 persons and the intensity of the train traffic is 45 sets per hr, heat emissions in the station are 8.2 times greater than they are on the run section of a single-track tunnel and 38.4 times greater than on the coasting section; when the car is filled with 125 persons and the intensity of the train traffic is 24 sets per hr, the heat emissions at the station are 16 times more than during the acceleration and coasting runs.

However, the actual distribution of heat flows on the section under consideration has not been taken into account by the planners. The Heat Sanitary Engineering Department of the Metrogiprotrans [State Planning Institute for Metro Transport] has developed a method for determining the amount of ventilation air with regard to heat excesses, based on the assumption that heat emissions in the tunnels during the process of the metro's operation are constant.

In connection with this, a constant expenditure of air is accepted for ventilating the metros. But inasmuch as actually during the "peak" hours the heat flows are significantly greater than those designed, and there exists a considerable lack of uniformity among the heat emissions with respect to the individual sections of the section under consideration, the air temperature rises in these elements more rapidly than in the others.

As long as the heat flows are not great, which usually takes place during the first few years of a metro's operation, the inevitable changes of interior temperature do not exceed the allowable limits. With the growth of traffic intensity, the heat flows increase, and the most heavily loaded elements of the line, more and more often, and in time even constantly, are under conditions whereby the air temperature exceeds the allowable magnitude. Thus, even prior to achieving its calculated development, a metro turns out to be without proper ventilation.

This brings about a premature reconstruction of the tunnel ventilation, and the amount of the air exchange sharply increases and approaches 500,000 cu. m per hr.

Reducing the air exchange in a metro, particularly during a warm spell, may be accomplished by means of increasing the heat-assimilating capacity of the ventilation air and decreasing the heat flows into the space of the station by means of localizing the heat at the site of its formation.

The air's heat-assimilating capacity can be increased by means of lowering its temperature by means of removing the heat. As a medium for removing heat from the air it is necessary to utilize the earth surrounding the tunnel. We must, however, strive to minimize the heat flows into the earth so that during the cold period we can succeed in cooling it down to its natural temperature by the beginning of the ensuing warm period.

Localization of the heat flow into the station space can be accomplished by means of a dispersed placement of the exhaust units of the station shaft under the station platform (see Figure).

Thus, a summing up of the facts set forth indicates that, in order to reduce air exchange during the warm season by means of increasing as much as possible the assimilating capacity of the outside air, the organizational schematic of air exchange in the metro must be constructed in such a way that the site of the greatest heat emissions on the section under consideration (the station) is supplied with outside air from the run; the latter must be pre-cooled by means of emitting heat into the earth, and, after the assimilation of heat surpluses at the station, it must be removed here through the station shafts. Along with reducing the air exchange, such a schematic allows us to ensure the least possible heat flows from the tunnel into the earth, which facilitates cooling down the earth during the cold season, when its temperature must approach its natural level by the beginning of the next warm period. Year-round ventilation according to the "run tunnel--station" schematic enables us to utilize fans with the maximum efficiency, while decreasing the air exchange facilitates reducing drafts in the places where service personnel and passengers are located.

As a result of introducing the new ventilation schematic, we can achieve savings in electric power, which, for example, on the section under consideration, from the Water Stadium to the Vokzalnaya Station of the Moscow Metro, amounts to 176,400 kW-hrs per year.

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CSO: 1829/57

RAIL SYSTEMS

ERRATUM: This Brief is republished from JPRS 84855 of 1 Dec 1983, No 137 of this series, to correct terminology used in the initial translation. The Brief was originally titled "Suburban Subway Holding Yard."

BRIEFS

COMMUTER TRAIN HOLDING YARD--Leningrad--A holding yard for suburban commuter trains is being built near the Devyatino Station by work crews of the 308th Administration of the "Sevzaptransstroy" Trust. When it is put into service, there will be a noticeable improvement in weekend passenger traffic on the Leningrad-Finland Division of the October Railroad. When construction is completed, on Saturdays and Sundays the commuter trains will not go all the way in to Finland Station, but only as far as Devyatino, where the new "Komsomol'skaya" subway station is located. A new platform and four terminal sidings are now being built there, and support towers for the overhead power network are being set up. The transportation builders intend to complete the work of modernizing the station ahead of schedule. [By V. Petrov] [Text] [Moscow GUDOK in Russian 7 Oct 83 p 17 7045

CSO: 1829/76

## MARITIME AND RIVER FLEETS

### CAPTAIN FAULTS QUALITY, ORGANIZATION OF RIVER FLEET SHIP REPAIR

Moscow VODNYY TRANSPORT in Russian 4 Oct 83 p 2

[Article by Instructor Captain V. Moskalev of the Volga United Steamship Company: "A Second Birth"]

[Text] The level of technical operation of ships and timely and qualitative repair of them are rising even more in importance for achieving efficient use of the river fleet.

The service life of ships from projects 588 and 26-37 already amounts to 25-30 years, and just recently ship repair plants were busy replacing their systems of hot and cold water pipes and water and steam central heating. Water seeps from the pipes under the deck covering and the panels get damaged and they decay. The deck is metal and here and there it rusts down to holes. First and foremost, a plant is precisely attuned to preparing main and auxiliary engines and the propulsion and steering complex. The remainder, such as minor ones, are delayed until later on: the ship, they say, won't stop because of these pipes. The trouble in the pipe system is turned around later on with big losses: it can happen that the entire metal decks have to be changed, and in turn this is connected with dressing out the cabins and other compartments.

Thus, the ancient way of setting up repair operations for primary and secondary ships often does not prove its value.

Everyone agrees that a passenger ship needs to be attractive no less than having its engines in good repair. And in this sense trivialities also are not at all impossible. The question was raised long ago at almost all levels of our branch, about creating if not a plant, then a shop even to assemble models of accessories from all types of passenger ships and to manufacture them in a centralized manner and according to plant orders, and thereby renewing this undertaking on motor ships to the maximum extent possible, let's say, during intermediate repairs. Door locks, handles for raising windows, baggage compartments, and many other things broke down long ago on many ships. Apparently the directors are right in declaring: "Our plant is not for consumer goods, and we have neither the equipment nor the specialists for manufacturing components of accessories.". But sad as it is, it's true. Whatever was obtained was installed in the ships' compartments. Here's both bronze, iron, and plastic of different colors in the same place.

Many ships of the "Rodina" type have already marked their 25th anniversary. If it's not really major, then it's intermediate repair that must be done on them in a considerably more qualitative manner than has been done up until the present time.

It's true that we're not talking about all of them. Intermediate repair of the diesel-electric motor ship "Lenin" was performed in an excellent manner at the plant imeni 40th Anniversary of the October Revolution under the guidance of Hero of Socialist Labor Ship Captain V. Kirillov.

And here's another example. During the years 1979 to 1980, this same plant made intermediate repairs to the motor ship "Taras Shevchenko," but nothing on it was essentially changed. Then this motor ship was transferred to the plant imeni Urtskiy in Astrakhan for maintenance. By now under the new name of "Sergey Kuchkin," in the winter of 1981-82 intermediate repair was done on its main and auxiliary engines and partially on the deck. And what happened next?

Then in 1982-83 came restorative repairs to the motor ship's interior accommodations.

As long ago as the spring of last year, this matter was examined both in the ministry, in the steamship company and at the plant. The most complicated thing was providing all the materials which were stipulated by repair departments. As a matter of fact, because of their late delivery, it was not until the middle of winter that the plant actively got down to work on the motor ship. But this was late both for the shops with their scarce staff and for the ship's crew which had to perform almost all the preparing, dismantling, and assembling. In addition, the crew performed a large amount of painting, carpentry, and joinery work.

But however hard that had to be for the plant management, the shops, and the motor ship's crew headed by Captain V. Prosvirnin, a task of enormous complexity was resolved.

Mariners of the passenger fleet recall very well how the "Sergey Kuchkin" looked prior to renovation. And now the work is completed.

The music salon was the main accommodation which was reequipped with a completely new appearance. Through the labors of joiners and skilled craftsmen G. Semenov and R. Alykov the salon became considerably richer, more beautiful, and even looked younger.

Instead of heavy wallpaper colored with somber shades, the bulkhead covering, the frieze between the columns, and the door interiors were veneered with light ash and polished.

The matter of restoring the reading salon and finishing the walls and ceilings which consist of Karelian birch was decided over a long period of time. As it turned out, there was no new veneer. They decided to restore the old veneer.

And why not? Under the hands of one of the best masters of the joinery shop I. Podlipalin, the panels and partitions were lit up with their former luster and the texture of the wood took on its original appearance.

Finishing of the movie hall caused particular delight. Although this was done first, the quality of work is faultless. I. Gerashchenko, the carpenter here, proved to be one of the oldest workers of the plant.

Unfortunately, a detailed description of everything and what and how it was done cries out to be written, but it would take up much too much room. After having seen the interiors of the "Sergey Kuchkin" for themselves, the passengers of course will evaluate the true worth of the collectives' labor, and of which I am enumerating just the least bit here.

Upholsterers under the guidance of A. Agafonov manufactured good furniture, and the team of seamstress V. Fedorova dressed up the motor ship with curtains.

Chief of the finishing shop Ye. Zhilkin introduced many gadgets and sensible suggestions in the process of renovating the ship and held technical operations under constant control.

And now, looking at what has passed, it's possible to say the following. Renovation must develop on all registered ships. Time is getting short. We have the experience and it should be incorporated more boldly, in spite of the complications in providing some materials.

But a reservation should be made here. As a matter of fact, while renovating the "Sergey Kuchkin," the plant curtailed almost all finishing operations on other ships and first and foremost in intermediate repairs.

What is to be done? It appears that preparatory measures are necessary immediately after completion of winter ship repairs. As a matter of fact, having concluded ship repairs, the shops prepare almost nothing for the next one. And during the summer, why couldn't they manufacture furniture, metal bathrooms and keys for the cabins, prepare and dry the deck boards, and have two or three blades of the rudder ready? It's already possible now to prepare components for the salons, restaurants, cabins and so forth using the examples of the same "Sergey Kuchkin." And, when ship repair begins, crew members could easily put these components in place.

This is what Ye. Zhilkin, finishing shop chief of the plant imeni Uritskiy, had to say in this regard: "If material were ordered for salons and a movie hall, we would immediately take another motor ship and the matter would be over. But nobody knows who decides this, when the materials will be arriving, and which motor ship is the next one subject to renovation. And then, ship repair is staring you in the face. Winter sets in and once again there is rush work, remodelling, disruption of deadlines, and finally low quality repairs."

And this is what's still important to note. When renovating a ship, it's necessary to have at the plant a single coordinating person like a work superintendent who could conduct the entire course of ship repairs. But, you know, in reality there are different opinions. Every shop manager and master is doing what is possible and convenient for him. But there must be a strict work management schedule that expedites the preparation of a ship as a whole. Specificity, personal responsibility, and good management are essential.

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## MARITIME AND RIVER FLEETS

### CSSR'S KOMARNO SHIPYARD'S CONTRIBUTIONS TO USSR FLEETS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Oct 83 p 3

[Article by TASS correspondent A. Kondrashov: "A Visit to the Shipbuilders of Komarno"]

[Text] The aquatorium of the Komarno creek of the Danube is not large and it is ringed on all sides by shop buildings, warehouses, a forest of gantry-crane booms. Yet the minute you arrive here the mental picture that emerges is one of vast ocean expanses and the radiant sweep of the Volga.

These feelings are prompted by the names of the ships nearing completion in Komarno. Here at one pier is a familiar Volgobalt, the penultimate ship of a series built in this Czechoslovak city for the Soviet Union. A little further along is the general cargo vessel Amur, the first of a new generation of river-sea ships that will replace the Volgobalts. In addition to plying river and coastal routes she will be capable of long voyages across the Black and Caspian Seas, the northern and Far Eastern sea routes.

Next in the creek after the Amur is the Ufa, a huge dredger all aglow with fresh paint. She too is the first of a new series of workships being specially built at the Komarno shipyards for work in Siberian and Far Eastern rivers.

"As you can see for yourself," the director of the Komarno shipyards Comrade Lukas Makhlitsa tells me, "our collective is going through an especially important period of its work. We are renewing our production program--construction is beginning of the most modern ships of various classes for our main client, the Soviet Union.

A lot of effort was put in by our engineers and designers to meet the requirements laid down by the client. Literally all the machinery and all the rigging of the new ships was improved, and now their seaworthiness and work parameters are of the very highest order. The Amurs, for example, will take on board 3,000 tons of cargo, 10 percent more than the Volgobalts, though their draught remains the same. This is a very important factor in river navigation. The new ships have greater operational autonomy, their loading and unloading mechanisms are more sophisticated and more powerful and their navigation equipment compares favorably with that of contemporary oceangoing vessels.

In addition, both the Amur and the Ufa have much better amenities and working conditions for their crews, the cargo ship has had a third, passenger deck added, and on the dredger all the living quarters are adapted for Arctic conditions.

This coming fall we will dispatch both new ships to the USSR. In subsequent years we plan to build for the USSR 14 Amur class vessels and 20 of the new dredgers.

Cooperation with the USSR and other CEMA countries is playing an ever-growing role in the life and work of the Komarno collective. Incorporated in every ship launched here is the labor not only of Czechoslovak workers and engineers, but of scores of plants in the socialist countries as well. The Soviet Union supplies the Komarno shipyard with large amounts of sheet steel, most of the electrical equipment, pumps, signaling and navigation mechanisms and devices. From Hungary comes the gravel-sorting equipment for the dredgers, from Bulgaria--radars and several types of radio equipment. The ships are painted by GDR chemists who provide Komarno with special marine paint and various anticorrosion lacquers. A number of assemblies and parts are supplied by Poland and Yugoslavia.

...With every passing year more and more ships built here and flying the Soviet flag sail out of the Komarno creek into the swift waters of the Danube. The Volga and the Dnieper, the Black and the Caspian Seas, the rivers of Siberia and Central Asia--that is where they will serve the national economy of our country. And on their maiden voyage down the Danube they will invariably meet caravans of barges headed for Czechoslovakia's Danube ports with cargoes of ore from Krivoy Rog or oversize machinery for the CSSR's new industrial enterprises or power plants. They will encounter and be greeted with a foghorn hoot by a Soviet tanker or freighter on its way to those same ports and sooner or later they will be easily overtaken and passed by a streamlined Meteor or Raketa hydrofoil flying the tricolor flag of socialist Czechoslovakia.

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CSO: 1829/68

## MARITIME AND RIVER FLEETS

### NIKOLAYEV YARD COMPLETES NEW BULK ORE CARRIER EARLY

Kiev RABOCHAYA GAZETA in Russian 20 Sep 83 p 1

[Article by RABOCHAYA GAZETA correspondent A. Kolesnik: "Bon Voyage!"]

[Text] The modernized ore carrier, Geroi Stalingrada, has left the docks of the Okean Shipyard 1 month ahead of schedule and gone to sea.

The ship is scheduled to cast off in an hour, but no one is about to quit its deck: someone is finishing a paint job in a hurry, others are checking the deck mechanisms for the umpteenth time. From here, the captain's bridge--up at the very "crown" of the ocean giant--comes a string of commands from delivery captains N. Starokozhko and N. Rosinets. They are also called "ship-yard" captains, which is understandable because around here they are the ones still in charge.

"Good men, these Nikolayevites," says shipmaster B. Kovalenko. "Excellent ship."

Boris Filaretovich can rightfully be called a "sea dog." He has been going to sea on ships of the Order of Lenin Black Sea Line for over 30 years, 18 of them on the captain's bridge. Several years ago he took delivery from the Nikolayev yard of bulk carrier Parfentiy Grechanyi and for some time was its skipper. Just a few days ago the news came in that Parfentiy Grechanyi had been declared winner of the All-Union socialist competition. Its crew was awarded the challenge pennant of the USSR Council of Ministers and the VTsSPS.

"As you can see," Captain B. Kovalenko continues, "this Nikolayev ship runs smoothly."

Geroi Stalingrada is an ore carrier of a new, modernized class. Its displacement is 66,000 tons or the weight equivalent of 10 railroad trains, speed--15.7 knots, the main engine has a thrust of 13,700 horsepower. This type of carrier can transport a variety of bulk cargoes. Its older sister ships bring in large-diameter pipes from Japan that go into gas-pipeline construction, bauxites from Africa and Australia and grain from the American continent.

The ship did not take long to build, thanks largely to the high craftsmanship, the persistence and professional know-how of the Nikolayev workers. They lent broad support to the initiative of shipwright I. Rossoshinskiy who exhorted his workmates to labor under the slogan "40 shock 10-day stretches to honor the 40th anniversary of the battle of Stalingrad." Exemplary work was done by the slipway, installation, completion and paint shop workteams. The construction of the ore carrier became a top-priority cause for every one of the many thousands of shipbuilders, but above all for those war veterans who actually fought in the battle of Stalingrad. Much selfless effort was put in by installation men I. Lebedev and I. Mogilevets, shipwright M. Gavrilov, slinger I. Goncharov, engineer S. Malygin and builder S. Arbuzov.

In response to a petition by VLKSM [All-Union Lenin Young Communist League] Central Committee the Okean Shipyard had at one time built a Komsomol series of six ships. These were named after Heroes of the Soviet Union Zoya Kosmodemyanskaya, Alexander Matrosov, Parfentiy Grechanyi, Izgutta Aytykov, Unan Avetisyan and Ion Soltys. The Nikolayev yard subsequently built larger vessels like the 130,000 ton oil and ore carrier Boris Butoma, the research ship Akademik Krylov, the supertrawlers-fish factories General Chistyakov and General Andryushchenko.

Last year they began construction of Odessa-class vessels. How are they different from the preceding series? The question is put to deputy secretary of the yard's party committee A. Shcherbenko.

"Many assemblies, machines and mechanisms have been modernized," he says. "The motor vessel is equipped with the most modern system of automated power plant and navigation. It has a bigger capacity. Those who will sail it have been specially provided for--the entire crew is to be housed in single-occupancy cabins. There is a gym and a swimming pool at their disposal as well."

In the course of the ore carrier's construction the most advanced technology and engineering techniques were applied.

The director of the Okean yard tells us:

"The ship's hull was put together of large-size sheets which were cut by program-controlled machines. Two-hundred-ton sections were preassembled separately, then crane-hoisted to the dock. The same method was used to install the 580-ton main engine. And, of course, our key concern was quality, because the carrier was being readied simultaneously for delivery to the accepting commission and the client and for certification with the State Emblem of Quality.

The last preparations are done and the ship is ready to sail. A meeting is held devoted to the completion of Geroi Stalingrada. Among the speakers were completion-team leader N. Gavril'yuk, installation man V. Vasil'chenko, veteran of the Battle of Stalingrad plant engineer L. Rudoy, first secretary of the party gorkom E. Shorin. They warmly congratulated the ship's builders for their newest labor victory and wished her crew seven feet under the keel [good sailing].

The party secretary of the Volgograd Shipyard V. Levkin presented souvenirs to the shipbuilders and the crew on behalf of a delegation from the hero-city.

A long-drawn-out blare from the ship's foghorn floats over the Bug River estuary, frightening the gulls, as the ore carrier Geroi Stalingrad slowly enters the fairway. She is beginning sea duty that will last many years.

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CSO: 1829/68

## MARITIME AND RIVER FLEETS

### PROBLEMS ENCOUNTERED IN WESTERN SIBERIAN RIVER SHIPPING

Moscow VODNYY TRANSPORT in Russian 6 Oct 83 p 2

[Article by VODNYY TRANSPORT correspondent G. Vstavskiy in Tyumen: "The North is an Examination"]

[Text] Navigation in the north in the Ob-Irtysh basin has entered the concluding stage. The fleet crews, port employees, and transportation engineers are keeping a heavy watch in Salekhard and Labytnangi, on the Nadym, Pur and Taz Rivers, and in the Ob Bay. On the final trips they are faced with delivering still hundreds of thousands of tons of varied cargo to the workers of the Yamal Peninsula and the oil and gas workers of the Tyumen area in the north.

The current navigational season is the first for the Ob-Irtysh joint steamship line created in Tyumen. In spite of its complex development, the young collective achieved quite good results during the previous months. And based on second quarter results, the steamship line was awarded the prize red banner of the MRF [Ministry of the River Fleet] and the trade union central committee.

And now the decisive days have arrived for the Irtysh and Ob river transportation workers, because the results of the northern navigational season in many respects will determine the work of the collective of many thousands.

V. Petelin, chief of the shipment and fleet traffic service, recounts: "According to operational data, we delivered more than 2.5 million tons of national economic cargo to the Arctic and the extreme north of the basin. We brought more cargo than last year to the Pur and Taz Rivers and to the northern part of the Ob Bay. Shipments of pipe for the gas pipeline built from Novyy Port are proceeding ahead of the established schedule. The plans will be fulfilled completely for delivering cargo to the almost inaccessible regions of the new Yamburg gas deposit. On the whole, northern cargo delivery is lagging behind last year's schedule. We're taking all measures now not only to reduce the lag, but also to deliver all cargo required by the northerners."

Every navigational season in the Ob-Irtysh basin is unlike the previous ones. It happened that way now too. It opened in the south of the basin earlier than the periods of many years' standing. And then spring arrived late in the northern latitudes. And, of course, it's necessary at the finish to recover those losses which the steamship line sustained during the development of the navigational season. But it will be very very difficult to do this.

Now the working day in the steamship line administration begins and ends with operational reports on the progress of northern delivery along all points of the Tyumen area in the Arctic. The tension is felt everywhere here and especially in the central dispatch of the steamship line. Round-the-clock contact is maintained with ports, wharves, and crews of the fleet. The telephone calls don't cease for a minute.

"This is Tyumen calling: report the situation," is heard in the office.

"There are 35 fleet units in Nadym: 14 ships are unloading and 19 are waiting."

The main dispatcher for northern shipments Vyacheslav Shilingas concluded the conversation with Nadym and Urengoy is calling already. The most difficult situation today out of all the northern ports and wharves is at the Nadym port. The lion's share of northern cargo comes right here. More than 100 cargo ships are here daily during the final days of the navigational season.

Additional measures are being taken now in the steamship line for an organized completion of the navigational season in the Arctic. Responsible workers, instructor-captains, and instructor-mechanics were sent to the line on a mission. The final trips will be carried out with special eagerness so that all ships may return to their planned points for wintering. The departure from Nadym of the last personnel and ships is planned for 9 October.

Deputy chief of the steamship line G. Shanev explained: "Of course, all our schedules for advancement and unloading of the fleet will be defined more precisely with regard for fulfilling the established plans. The period of the navigational season in the north of the basin will become a serious examination for the maturity of the entire collective."

It's a test by the north. Many crews of the transportation and dredging fleet have been taking an examination here during recent years. It's not easy for crews to work in an oil and gas region: there aren't enough mechanized berths, transshipping equipment, and working hands at many of the trading posts. Frequently, we have to adapt the river fleet to the complex maritime conditions of navigation. Northern gales test the character of the river transportation workers and their skill almost every day.

But, in spite of the extraordinarily difficult navigational conditions, many of the fleet's crews, docker teams and route workers are using the shock labor method. Many crews of the Tyumen SSRZ [shipyard] are coping very well with shipments to the Nadym River; tugboat crews of the Omsk SSRZ are working in a well-coordinated manner in the north; and motor ship crews of the "Vitim," "Aldan," "El'ton," and "Karpinskiy" of the fleet's Tobolsk REB [maintenance and operation base] are selflessly keeping watch.

Triumphant reports from the fleet are arriving these days at the steamship line administration and the basin committee of the trade union. Among them is a radiogram from on board the RT-629 motor ship of the Tyumen SSRZ concerning fulfillment of the navigational plan ahead of schedule.

The team of this motor ship under the guidance of Captain M. Kugayevskiy worked on the Nadym River and is now carrying out shipping on the Pur. And the crew is setting the example everywhere for labor.

The amicable crew of the ST-785 motor ship is working in the Salekhard region. The high honor of being the initiator of competition in the basin fell to this collective. The river transportation workers believe in their word! The navigational plan was fulfilled ahead of schedule and the crew is working on the account of the next navigational season.

Collectives of the OTA-975, OT-2024, "Morskoy-5," "Lenaneft'-2014" motor ships, and many others are among those who are successfully completing the navigational season. Having fulfilled the navigational plans ahead of schedule, the ship crews are taking on higher commitments.

Unfortunately, the good spirits of the fleet's crews and their shock labor rhythm in shipping, in all probability, are not considered at the headquarters of the steamship line. Already at the beginning of September here they were calculating the anticipated volumes for carrying out northern shipments. For the time being, these figures have a minus sign. Almost 300,000 tons of cargo remain beyond the margin of anticipated resources of the Ob-Irtysh river transportation workers.

I would remind you that in its commitments the steamship line collective promised not only to completely fulfill the entire northern delivery, but also to deliver 50,000 tons of cargo over and above the plan to workers of the Yamal Peninsula.

Today in the steamship line they're trying not to remember these commitments. And that's a pity! There are also considerable resources here for fulfilling both the plan and the commitments.

Of course, the main reserve is in expediting fleet processing and especially at clients' berths. According to operational data, in just the first 10 days of September the fleet's above-norm idle time at northern berths was more than 500,000 tonnage-days, including 365,000 tonnage-days lost at the Nadym berths. According to enterprises of the Ministry of Construction of Petroleum and Gas Industry Enterprises, the plan norms were overstated by a factor of 2, and even by a factor of 2.5 at berths of the Main Administration for the Construction of Pipelines in Siberian Regions. The fleet loses a lot of time at the Salekhard roadstead. On separate days, 15 to 20 ships pile up while awaiting repair of radar equipment. Specialists of the Salekhard BPU [coastal production section] evidently are not coping with the increasing volume of repair. They need urgent assistance from the southern enterprises of the basin.

Ship idle time during refueling of the fleet and at floating stores became more frequent at the end of the navigational season. Losses of navigational time because of a lack of personnel, especially cooks and radio operators, were also great. A considerable reserve lies as well in improving the organization of competition, and especially in making the results of them public. For the time being, the fleet's crews are finding out the results of labor rivalry with great delay, and triumphal pennants are not being presented in the fleet. In

September, many crews got up for the shock labor watch in honor of the 25th anniversary of the beginning of the movement for a communist attitude towards labor. And everything must be done so that the labor impulse and initiative from below are actively supported in the steamship line administration and the basin committee of the trade union. Because in these strenuous days there is no more important task for the Ob-Irtysh steamship line than completing the navigational season in the Arctic in an organized manner and taking the entire fleet out to the southern latitudes of the basin in a timely manner.

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CSO: 1829/43

## MARITIME AND RIVER FLEETS

### RIVER SHIPPING DEVELOPMENT IN WESTERN SIBERIA

Moscow VODNYY TRANSPORT in Russian 24 Sep 83 p 2

[Article by A. Avdeyev: "Along Small Rivers"--passages within slantlines are printed in boldface]

[Text] /The CPSU Central Committee and the USSR Council of Ministers congratulated all participants on their remarkable achievement in building the Urengoy--Pomary--Uzhgorod gas pipeline. "In this outstanding victory they personify the patriotic enthusiasm of many labor collectives and building, gas extraction, machine building, metallurgical, and transportation enterprises and organizations," it says in the greeting./

/We have talked more than once about the outstanding work of sailors who have delivered hundreds of thousands of tons of pipe and other cargo via the Northern Sea Route in the Arctic. The river transport workers who opened new transportation routes along small rivers have labored with no less enthusiasm./

/The building of fuel main lines continues to gain tempo. Installation of the next gas pipeline from Urengoy to Tsentr is proceeding at full speed, high-power compressor stations are being erected, and the workers' and operators' settlements are growing on the oil and gas deposits./ This means that even greater effort is demanded from those who supply this region with all of its things necessary for normal life and work.

The taiga here closely approached the shores. It seems a river finds the way to its green sea with some difficulty and that's why it makes such whimsical loops. It no sooner broadens and flows freely than once again from a running start it beats against a precipice and thunders at a shoal. Places of rare beauty are encountered in the land of Siberia. But Stanislav Pavlovich Mikhaylov is in no mood for the beauty of nature right now. This is along the Ob--a comfortable journey which is a must--and where it's possible to travel peacefully both day and night, relying upon situation signs. But here is the Bolshoy Yugan. At times it's almost up to one's knees under the keel and there's nothing unusual here about both obstructions, jetsam, and fishing nets. In official language, this is called navigation along disarranged rivers.

However, the difficulties of river transport workers is not the business of builders, people of the most widespread profession in Tyumen Oblast now. Give them cement, reinforced concrete, bricks, pipe for gas pipelines and hundreds more names of building materials, and not even really speaking about equipment and machinery. The people must make a living, dress, have entertainment, and look after their relaxation. And all this rests on the shoulders of transportation workers. But can you bring a lot through swamps along a winter road or in a helicopter, if there's no other way to such a settlement as Kamennyye Peski to which Mikhaylov is taking his tugboat right now!

Nevertheless, this was considered earlier prior to building the pipeline pumping station there. Now the Bolshoy Yugan counts. Workers of the Surgut technical operations shop--one of the subunits [podrazdeleniye] of the industrial trust for motor vehicle and water transportation of Glavyumenneftegazstroy--are committed to ship 8,000 tons of building materials via the Bolshoy Yugan. They are coping successfully with their commitment. And here on the 10th day since beginning to fulfill this task, a group of ships has begun the last trip.

The way is difficult along the Bolshoy Yugan. It demanded skill and experience from Mikhaylov who headed the group for piloting the heavy barges. Nevertheless, Stanislav Pavlovich's colleagues such as Captains A. Petrov and N. Shatov also aren't novices in their business, and they have been piloting tugboats along Siberian rivers for a long time. The efficient organization of operations, which was thought over in small detail, became the principal merit of this navigation. A meeting in Tyumen is recalled.

"By the plan of our trust," recounted its manager V. Karelkin, "it is envisaged to ship 58 million tons of cargo. If the spring and fall periods of bad roads are excluded, the drivers work year-round. Of course, it's more complicated for the river transportation workers. Navigation on some rivers in the oblast lasts less than a month. Last summer we shipped almost 400,000 tons by water routes. This is somewhat like a little out of the overall volume. But, you know, these cargoes were delivered to the most nearly inaccessible places and to the most remote construction projects. The tasks of navigation-83 have become more complex, and therefore we have prepared especially carefully for it."

There are five technical operation shops in the trust. A fleet repair and operations base consolidates them where there are both a slipway and all necessary equipment for renovating self-propelled equipment, tugboats, barges, and floating cranes. Without a base of this kind, it would be difficult to provide reliable operation of the fleet, which consists of more than 200 units.

However, high quality repair is just one side of the matter. Another one is in the efficient interaction of all subunits of the trust. Comprehensive teams of drivers and river transportation workers were created in Surgut, Nefteyugansk, and Nizhnevartovsk. Thanks to the action of such teams, the fleet didn't stand idle and cargoes are being delivered in storage in good time. A group of 11 tugboats and barges was organized for rapid delivery of building materials via small

rivers. Included in it are a floating crane and a crew which is headed by the experienced specialist A. Dubinin. A regulation was developed for a group method of ship operations in which a supplementary payment was stipulated for overfulfilling the plan. During all the summer months, the schedule of ship traffic was observed everywhere.

"One of the most complex tasks for the group," says Captain S. Mikhaylov, "was the delivery of cargo along the Pim, which is an undeveloped and capricious river. Navigation here is possible only 25 to 30 days a year. The nights are light in June and therefore we try not to lose even an hour. We worked in harmony. And besides, how could it be otherwise under such conditions? The more so as we struggled not for personal, but for common success. According to the plan, it was necessary to deliver 16,500 tons of building materials to the Lyantor oil deposit where the "Surgutneftepromstroy" trust is engaged in the layout and erection of dwellings. During the month which the river gave us, we delivered 18,500 tons. It appears we worked well. From there we crossed to the Bolshoy Yugan. And think about it, we were equal to the task here."

No less complex for the trust's river transportation workers was the operation in Uryev channel where there are no situation signs on the river either, and the tugboat captains pilot their ships relying only on skill and experience. The Agan, Tura, Vakh, Konda and many, many small rivers in Tyumen Oblast became reliable assistants of the builders and mineral prospectors.

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CSO: 1829/43

## MARITIME AND RIVER FLEETS

### PROFITABILITY OF RIVER FLEET SHIPPING ANALYZED

Moscow RECHNOY TRANSPORT in Russian No 8, Aug 83 p 19

[Article by T. Kostkina, Leningrad Water Transport Institute: "For Profitable Transport Operations"]

[Text] Shipping companies of the Ministry of the River Fleet, including those of the Northwestern Basin, have undertaken an analysis of the rate figures, cost and profitability of transport operations for 115 cargo categories with respect to the existing rate, that is, in terms of types of dry cargo and petroleum cargoes, rafts, types of traffic, traffic conditions and sizes and types of shipments.

Recent years have seen the shipping companies of the Northwestern Basin transport enormous volumes of grain, forest products, ores, coal, sand and sand-gravel mix, crushed rock, gravel, construction materials, cement, ferrous metals and apatites. Northwest shipping company grain shipments show normal levels of profitability 55.5 per cent on intrabasin, 76.6 per cent on interbasin lines). In the other shipping companies in the basin they are unprofitable in all types of traffic considered. Grain shipments over the main lines in the Belomorsko-Onezhskoye company are the most unprofitable of all. Losses on shipments between points not connected by railroad ran to 43.5 per cent, production costs computed on a 10 t·km basis exceeding the rate of income some 1.78 times.

The profitability of shipments of forest products was computed for ten product categories, including fireplace wood and bulk and packaged round timber and lumber. All basin shipping companies have been transporting forest products in different types of traffic. Most of them have been transported by ship (accounting for an average of 95 per cent of a shipment).

Computations have shown that shipments of unpackaged round timber between points which are not connected by railroad show fairly high rates of profitability, but in a number of shipping companies these rates do not reach norm level. The highest levels of profitability achieved from these shipments were reached in the Belomorsko-Onezhskoye (97.7 per cent) and Sukhonskoye (57.1 per cent) shipping companies. The transport of timber by ship has also been highly profitable here. The Belomorsko-Onezhskoye shipping company showed a 98 per cent profit on these shipments, 1.4 times as great as the profit on mixed consignments. The profitability of these shipments was lowest in the Northern Shipping Company (7.6 per cent).

The profitability of shipments of nonpackaged round timber by the Northwestern Shipping Company, which transports most of it within the basin, remains below normal, the figure being 40.3 per cent on intrabasin lines. Interbasin shipments have a normal profitability of 60.5 per cent. Shipments of nonpackaged timber in through water traffic between points connected by railroad by this company are unprofitable. Losses on intrabasin shipments in 1980 ran to 37.3 per cent, 94.5 on interbasin shipments. Profitability on shipments of round timber in packages is low and figures out at 19.6 per cent on intrabasin and 33 per cent on interbasin lines. Shipments of packaged timber in through water traffic are unprofitable.

All shipping companies in the basin are engaged in transporting lumber, but as calculations show, their current profitability does not insure normal profit levels. The profitability of the Northwestern Shipping Company, which handles 73.8 per cent of the entire volume of lumber shipments within the basin, is 10.9 per cent, that is, considerably below normal. Lumber shipments by all other shipping companies are unprofitable. Nor are normal profitability levels insured in the case of shipments of packaged lumber in any of the modes of transportation under consideration here. The profitability figure for the Northwestern Shipping Company was 38.3 per cent, which includes a 36.1 per cent profitability for ship transport.

Profitability figures for the Northwestern and Belomorsko-Onezhskoye shipping companies, which handle the bulk of firewood shipments (88.5 per cent), are considerably below normal (9.2 and 32.2 per cent respectively for intrabasin lines, 36.5 and 40 per cent on interbasin lines). Firewood shipments by the Northern and Western shipping companies are unprofitable, while the Sukhonskoye Shipping Company shows a similar level of profitability (51.7 per cent).

The Belomorsko-Onezhskoye Shipping Company handles the bulk of the ore shipments within the basin. Losses on these shipments in combined rail-water traffic run to 4.5 per cent, 18.1 per cent on intrabasin lines. The basic reason is the establishment for this shipping company of exclusive rates for the shipment of ores.

All shipping companies except the Western handle coal shipments within the basin. A substantial number of intrabasin consignments are moved over trunk lines between points not connected by railroads (89.4 per cent of the total volume). Only the Northwestern Shipping Company is engaged in interbasin traffic; this includes 89.8 per cent in combined rail-water traffic, losses from which figure out at 51.6 per cent. The main reason for this has been the establishment of exclusive tariffs.

The profitability of coal shipments fluctuates sharply as a function of the type of traffic involved. In the case of shipments between points not connected by railroad it is high, reaching 57.8-131.4 per cent. Coal shipments are unprofitable only in the case of the Sukhonskoye Shipping Company (unprofitability running to 3.5 per cent), which is to be explained by the sharp increase in the cost of these shipments (on the average double those of other shipping companies in the basin) while profits are maintained at roughly the same level as those of the other companies.

Mineral construction materials, including sand and sand-gravel mix, comprise one of highest-volume cargoes moved within the basin. The profitability of these shipments, however, remains substantially below normal levels. For distances up to

320 km the profitability of shipments of sand by the Northwestern and Northern shipping companies, which move the bulk of these consignments (90.4 per cent), is 25.5 and 10.1 per cent respectively. With shipments of sand for distances greater than 320 km, the Northwestern and Belomorsko-Onezhskoye shipping companies show the great profitability (45.9 and 30.4 per cent respectively). Shipments of sand and sand-gravel mix are unprofitable for individual companies depending upon the type of traffic involved.

The main lines of the Northwestern Shipping Company show the highest rates of profitability on shipments of crushed rock and gravel (73.4 per cent on intra-basin, 186.1 per cent on interbasin lines). The profitability of these shipments is near normal in the case of the Western Shipping Company, but figures for the Belomorsko-Onezhskoye and Northern companies show only low levels of profitability for shipments in this category. Particular attention should be given to unprofitable shipments of crushed rock between points connected by railroad. Losses on these shipments in direct water traffic handled by the Northwestern Shipping Company run to 3.45 per cent, on those handled by the Belomorsko-Onezhskoye company to 40.3 per cent on intrabasin, 24.5 per cent on interbasin lines. Gravel shipments on main Western Shipping Company lines show high levels of profitability (67.4 per cent). This company handles only a comparatively small volume of shipments in this category, however (9.4 per cent). Substantially larger volumes are moved by the Northwestern and Northern companies (46.2 and 36 per cent respectively). The profitability of these shipments here is two times lower than normal in the first instance, while in the second figures show them to be unprofitable generally. The Belomorsko-Onezhskoye Shipping Company handles the bulk of gravel shipments between points connected by railroad. It accounts for 90.9 per cent of the volume in intrabasin traffic at a profitability of 36.1 per cent.

Calculations have also shown that only in the cases of the Northwestern and Northern shipping companies do cement shipments show a profit (profitabilities of 9.5 and 5.9 per cent respectively), while losses for the Belomorsko-Onezhskoye and Sukhonskoye companies are running at 55.3 and 31.5 per cent.

Shipping companies have experienced difficulty in computing profitability on their freight movements because of differences in cargo category designations employed in computation procedures and the methods used to compile rate statistical reports and to compute costs and profitability on shipments by types of cargo.

Profitability figures have been distorted in a number of instances because transport costs have included all fleet operations within a shipping company area regardless of place of registry, while revenues have been computed taking account only of net freight outgoing.

A number of difficulties have also arisen in computing the profitability of raft-towing operations because of discrepancies occurring in the computation of raft volumes with respect to rate figures, which have been established in strict accordance with rate manual 3-R for each section of the river, and towing costs, which are computed on the basis of actual raft volume for each section.

In preparing the draft of the new schedule of freight rates, work on which is to begin in 1983, it will be necessary to take account of all shipping-company observations concerning the organization and methods employed in computing the profitability of cargo transport operations.

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CSO: 1829/35

## MARITIME AND RIVER FLEETS

### HISTORY, ACTIVITY OF CENTRAL ASIAN STEAMSHIP COMPANY

Ashkhabad TURKMENSKAYA ISKRA in Russian 9 Sep 83 p 2

[Article by B. Suvorov, honored TuSSR transportation worker and first deputy chief of Order of the Red Banner of Labor Central Asian Steamship Company: "Motor Ships are Proceeding Along the River"]

[Text] The Central Asian Steamship Company was created in August, 1923 by order of the People's Commissariat of Transportation Means under F. E. Dzerzhinskiy. It inherited 10 power-driven vessels, 15 nonself-propelled barges, and 4 auxiliary ships.

Time passed and it urgently dictated the necessity to enlarge the fleet with newer and more ideal ships and with qualified staffs of sailors and river transportation workers. They began to build ships of this kind at the ship repair plant in Aralsk and at the large shops in Khodzheyli, Termez, and Chardzhou. The first ships were named after communists and participants in the struggle to establish Soviet power in Central Asia. At the same time, they were training specialists and inland waterways workers, mainly former ship's cabin workers, at the FZO [factory training] school in Chardzhou, at schools for commission personnel attached to the steamship company, and at the Tashkent river technical school. Hundreds of excellent mariners and fleet commanders came out of them, such ones as Hero of Socialist Labor Captains K. Khatamov and Sh. Dzurayev, mechanics A. Yagupov and M. Yagdyyev, and many others of whom the steamship company is now proud.

Steamship company workers fought valiantly at the fronts during the Great Patriotic War. More than 1,000 river transportation workers and sailors were left on the fields of battle. During the war years, the steamship company fleet transported a large number of troops and equipment for the front and delivered cotton to the central part of the country from which military products and uniforms were manufactured.

During the postwar years, the load on the steamship company increased significantly. The volume of passenger and cargo shipments grew. Therefore, large operations were carried out for modernizing and reequipping ships for the purpose of increasing their technical and operational data. And at the present time,

the steamship company's fleet continues to be enlarged with modern self-propelled and nonself-propelled ships with increased power and carrying capacity. Prior to the October Revolution, there was essentially no port and wharf economy in Amu-Darya. Since the river channel was changeable, the steamship workers of that time, fearing erosion of port structures, did not build them. All loading and unloading operations were completed by hand.

Just during the time of Soviet power since 1928 has a port economy begun to be created in Aralsk, Farab, Chardzhou, and Kerki. And the first-class mechanized port of Termez was built in the 1960's and 1970's, which has now acquired important international significance. Our country transports products, motor vehicles, tractors, technical equipment, and mineral fertilizer through it to the Democratic Republic of Afghanistan. And cotton, raw leather, dried fruits, carpets, and karakul wool go from the Democratic Republic of Afghanistan to the USSR. Business relations based on friendship and mutual assistance were established between the inland waterways workers of the steamship company and the port workers of Afghanistan. In 1970, the steamship company made mutual bilateral commitments with the Afghan side directed at increasing cargo shipments and raising labor productivity in the fleet and at ports.

Quite a few valuable undertakings came into being in the steamship company's fleet. Widely known, for example, is the initiative of crews from the motor ships "Lenin," "Shaydakov," "Tuapse," and "Astrakhan" who were the initiators of competition for increasing the carrying capacity of ships and completing tasks of the 10th and 11th Five-Year Plans ahead of schedule.

The leading workers' initiative, which was picked up by all fleet crews of the basin, provided outstanding results. The initiators of competition fulfilled the 10th Five-Year Plan in 3 years and 8 months. The crews of more than 30 ships reported completing tasks of the plan ahead of schedule. They transported 3 million tons of varied national economic cargo over and above the five-year plan.

Introduction of the Shchekino method and the method of piloting crewless barges in shipping mineral and building materials cargoes and containers played an important role in raising labor productivity in the fleet. As a result of incorporating progressive forms for organizing labor in the fleet, approximately 3,000 persons of the navigational staff were released and in this case the volume of shipments doubled.

The steamship company's collective is constantly enhancing the glorious labor traditions. More than once it has come out the victor in all-union socialist competition. In 1973 the steamship company was awarded the Order of the Red Banner of Labor. More than 1,000 inland waterways workers were awarded orders and medals of the Soviet Union. Among them were Ch. Gel'dyyev, I. Nurmetov, A. Stroganov and others. The steamship company's collective was awarded a Leninist diploma for completing tasks of the 10th Five-Year Plan ahead of schedule.

The steamship company's workers marked the current five-year plan with shock labor. During two of its years, inland waterways workers transported more than

600,000 tons of national economic and foreign trade cargo over and above the plan. In 7 months of this year they added 180,000 tons more to it.

The steamship line is being replenished with a new fleet. The Chardzhou ship repair plant built an electric-driven barge and machinery transporter with improved ladders and ramps for operations at ferry crossings. A barge of this kind is working already at the Chardzhou-Farab ferry. A modernized version of this barge is earmarked for series output. This same plant is building the new and comfortable passenger motor ship "Yubileynyy" and a slipway for mechanical docking of 500 ton barges and large wheeled motor ships.

The steamship company has outstanding personnel at its disposal. There are 680 specialists with a higher education and 234 with average specialization working in the collective. There are more than 700 communists and just as many Komsomol members here.

The Chardzhou river technical school, which marked its 50th anniversary this year, is the training base of specialists for the fleet. For a half century it provided more than 4,000 qualified mariners, ship mechanics, and water engineers.

The Komsomol youth crew of the motor ship "Oleg Koshevoy" completed the 10th Five-Year Plan ahead of schedule, and its captain I. A. Smykovskiy became a bearer of the Order of the Red Banner of Labor. According to results of all-union socialist competition, for the first quarter of this year the crew won the challenge pennant of the USSR Ministry of the Maritime Fleet and the branch's trade union central committee.

The brigade of dockers and machinery maintenance workers headed by communist A. Grishchenko became the initiator of socialist competition in the ports' collectives. The Komsomol youth brigade of ship assemblers headed by V. Bortsov is working with the shock labor method at the Chardzhou ship repair plant.

The basis of the steamship company's successes is the selfless labor of the multinational collective and the important organizational and political-educational work of practical instructors and party and public organizations who put into practice the decisions of the November 1982 and the June 1983 Plenums of the CPSU Central Committee and the country's food program.

Today the steamship company's collectives are standing watch in honor of the 25th anniversary of the movement for a communist attitude towards labor. More than 1,500 workers of the steamship company are striving to confirm the title "shock worker of communist labor." Labor rivalry is expanding also under the motto "honor and glory are according to labor!"

Fleet workers, port employees, and ship repair personnel have a good working attitude. And there are no doubts that they will complete the third year of the 11th Five-Year Plan ahead of schedule. In any case, they will celebrate the 60th anniversary of the TuSSR and the Communist Party of Turkmenistan with honor and deeds of labor.

## INTERSECTOR NETWORK DEVELOPMENT

### GOSPLAN DEPUTY CHAIRMAN ON TRANSPORTATION DEVELOPMENT TASKS

Moscow PLANOVYE KHOZYAYSTVO in Russian No 12, Dec 83 pp 3-10

[Article by V. Biryukov, deputy chairman of USSR Gosplan: "The Country's Transportation System Under Modern Conditions"]

[Text] The growth of the economy, the involvement of natural resources of eastern regions in economic circulation, the accelerated development of republics of Central Asia and the Transcaucasian area and the rapidly growing volumes of passenger transportation have made it necessary to create and improve various kinds of transport and a transportation system that satisfies the needs of the national economy and the population for shipments. Planned management of the economy has made it possible to form a transportation system which includes rail, sea, river, automotive, air and petroleum, petroleum-product and gas pipeline transportation. All this has made the transportation system highly effective and enabled us to get by with relatively moderate expenditures in spite of the country's immense area and the great distance of a number of industrial centers from the sources of raw materials and fuel. Fixed capital in transportation comprises 16 percent of the overall fixed capital.

The results of the work of the country's transportation system in 1970-1980 and the first years of the current five-year plan are presented in the table.

All kinds of transportation developed satisfactorily during the period under consideration. The exception was the railroad, whose work has deteriorated in recent years. Under the 9th Five-Year Plan it annually increased the volume of shipments by almost 5 percent. During the first 3 years of the 10th Five-Year Plan these rates were 2-3 percent; and in 1979-1982 they practically did not increase. Yet the material and technical base for rail transportation developed at relatively rapid rates during the past decade and beginning of the current one, which created conditions for increased volumes of shipments. These possibilities were not realized primarily because of the deterioration of the organization of operations work. Moreover, in individual years (for example in 1979 and 1981) the volumes of shipments were less than in preceding ones in spite of the efficiency work that had been conducted. This could not but be reflected in the development of the national economy.

Kind of transportation	1970	1975	1980	1981	1982	1983	
						plan	Expected fulfillment
Cargo shipments, billions of ton-kilometers							
Railroad	2494.7	3236.5	3439.9	3503.2	3467.6	3540.0	3585.0
Sea	656.2	736.3	848.2	853.4	834.5	866.2	876.0
River	174.0	221.7	244.9	255.6	262.5	269.2	270.3
Automotive	220.8	337.9	432.1	458.9	467.2	468.0	476.0
Petroleum & product lines	281.7	665.9	1216.0	1263.2	1306.8	1345.0	1361.0
Gaslines	126.0	280.0	569.9	681.0	771.5	870.6	882.7
Total	3953.4	5478.3	6751.0	7015.3	7110.1	7359.0	7451.0
Passenger transportation, billions of passenger-kilometers							
Railroad	265.4	312.5	322.1	344.6	347.9	360.5	362.0*
Bus:							
public	202.5	303.6	389.8	401.7	412.6	421.5	421.5
department	39.0	72.7	128.6	130.0	133.0	135.0	135.0
Air	78.2	122.6	160.6	171.7	172.5	172.5	176.0
Private car**	22.6	72.8	202.0	220.0	240.0	250.0	250.0
Total	607.7	884.2	1204.0	1268.0	1306.0	1339.5	1344.5

\* Including 7.5 billion passenger-kilometers resulting from changing accounting.

\*\* Estimate.

With the elimination of many deadhead runs, trips that were too long and other inefficient shipments, it became possible to utilize the rolling stock that had been released to move other important cargoes. As a result, in 1978-1982 inefficient rail shipments were reduced each year by 28-30 billion ton-kilometers. In 1983 it is intended to reduce them by 30 billion ton-kilometers.

Accelerated development of gas and petroleum pipelines has made it possible to lighten the load on railroads somewhat, including coal shipped on them. But all this could not compensate for their unsatisfactory work.

At the November (1982) Plenum of the Party Central Committee, General Secretary of the CPSU Central Committee Yu. V. Andropov noted: "The indicators of the operation of the railroads, unfortunately, are becoming worse each year in spite of the significant amount of assistance that is being rendered by the government to the Ministry of Railways. The volume of capital investments in this ministry has increased by 43 percent as compared to 1975, and the fleet of mainline steam and electric locomotives has increased by 23 percent. The CPSU Central Committee and the government have adopted a number

of decisions for improving the social conditions for railroad workers and improving the management mechanism in transportation. But so far we have not received the proper return from the measures that have been taken."\*

Following the instructions of the Plenum of the CPSU Central Committee, this year the Ministry of Railways has improved its work somewhat. The repair of locomotives has been organized better, multiple manning has been eliminated in the service for them, more attention is being devoted to repair of the fleet of cars (enterprises of many branches of industry are rendering essential assistance in this), labor and production discipline have increased, the regulation of the fleet of cars has improved, and so forth. As a result, the plan for shipments for the 9 months of 1983 was fulfilled, and cargo turnover increased by almost 60 billion ton-kilometers as compared to the corresponding period of last year. There is every reason to expect that the plan for the year will be overfulfilled.

But it is too early to speak about complete satisfaction of the needs of the national economy and the population for shipments. Many shortcomings have still not been eliminated: residuals of unshipped cargo have not been eliminated everywhere; there are late shipments; during the summer there are difficulties in acquiring tickets; passenger trains are late, and so forth. It is necessary not only to further increase shipments, but also to improve their quality, to deliver products promptly, especially agricultural products, to provide for the creation of supplies for the winter, and also to solve other economic problems. In 1984 it is intended to further accelerate the rates of increase of shipments by rail transportation in order to make up for arrears by the end of the five-year period.

There are possibilities of doing this. The main thing is to increase discipline and responsibility for the work that is assigned and to improve the operation of the fleets of cars and locomotives.

At the present time the experience of the Moscow Railroad in using long trains is being successfully disseminated. On a number of roads this method is being reinforced with the corresponding extension of the receiving and dispatch tracks, which makes it possible to regard this as a permanent method of increasing the handling capacities of the railroads. Reserves of individual enterprises are being extensively revealed and put to work. As a result, the turnover of cars is improving. Although the level that has been reached is not adequate, there is reason to think that the reserves for operating means of transportation and railroads will produce results.

The country's transportation system will be faced with large tasks in the next few years. This will require, in addition to mobilizing reserves, further development of transportation. Even in 1985 the main kinds of transportation should ship (in millions of tons): coal and coke -- 831, petroleum cargo --

\*"Materialy Plenuma Tsentral'nogo Komiteta KPSS 22 noyabrya 1982 goda"  
[Materials of the Plenum of the CPSU Central Committee of 22 November 1982],  
Moscow, Politizdat, 1983, p 15.

1,186, including through pipelines -- 682, ferrous metals -- 210, timber -- 274, mineral-construction materials -- 1,410, grain -- 154 and other cargoes, including consumer goods -- 780. Gas pipeline transportation will have to increase the amount of gas that is pumped to 640 billion cubic meters, which will amount to about 500 million tons.

In connection with the deepening specialization in individual regions of the country, the increased extraction of raw material resources in eastern regions, the integration of the economic activity of the CEMA countries, and the satisfaction of the rapidly growing demand of the population for passenger transportation, there is the task of accelerated increase of handling capacities. The main path is to strengthen existing communications, primarily by applying the achievements of scientific and technical progress, and above all, better means of control. It is intended to construct new means of transportation primarily in newly assimilated territories and in order to improve service for agricultural production. Here main attention will be concentrated on completing work which is already under way.

In the Far East and Eastern Siberia the Baykal-Amur Mainline will be under construction on a broad front. Through traffic on the BAM will be started under the current five-year plan, and under the next one it will join to already existing railroads, thus sharply improving communications between the Far East and Siberia and the European regions of the country. Prerequisites will also be created for assimilating the large zone of the BAM. But railroad construction will not end here.

It will be necessary to improve transportation service for the Yakutsk ASSR, by extending the BAM--Tynda--Berkakit line, in order to provide for regular year-around shipment of cargo to this extremely rich region of the country. In the BAM strip it will be necessary to construct a number of highways and side roads to forest areas and deposits of minerals.

Moreover, Far Eastern lines are being electrified, which will not only reduce the expenditure of diesel fuel, but will also increase the reliability of the operation of rail transportation as well as its handling capacity. Extensive transportation construction is being done in regions of Eastern and Western Siberia and Krasnoyarsk Kray. Two roads have already been constructed here from Tashkent to the Lena, which provide reliable communications between the Bratsk Territorial Production Complex and the country's railroad network. Construction has been completed on a petroleum pipeline to the Angara Oil Refinery, which has made it possible to eliminate the transportation of petroleum by rail.

The ferry crossing to Sakhalin is being renovated. It is distinguished by its efficient functioning. With its startup, difficulties with communication between the island and the country's general transportation system will be eliminated. But the economy is developing, shipments are increasing, and it is necessary to increase the handling capacity of transportation. Additional docks and new ferry boats are being constructed for this.

A second section of the new port Vostochnyy is being constructed. Modern complexes are already in operation for shipping timber, industrial chips and coal. New container complexes are being constructed under the current five-year plan. The capacities created at the ports of the Far Eastern Basin open up good possibilities of increasing coastal shipping to Magadan, Chukotka, Kamchatka and other regions of the country.

For delivering cargoes to the northern regions of the Yakutsk ASSR, Kolyma and also Irkutsk Oblast, a large role will be played by shipments on the Lena River. At the present time they are solving the problem of expanding these shipments and providing for guaranteed movement of cargoes.

River transport workers have done a good deal in this respect: they have constructed the large transshipment port of Osetrovo, cleared the bed of the river, and essentially transformed its upper reaches into a shipping canal. But the volume of work that has been done is still inadequate. It is necessary to have further provision of continuous shipments along the Lena. Planning developments have shown that there are several variants of decisions for this, and the most effective of them will be determined by the USSR Gosplan.

A large amount of work is being done for the development of the railroad network between Eastern Siberia and the Ural area, and between the Ural area and the center of the country. Shipments here are increasing at more rapid rates than on other roads. Therefore the most constant attention is being devoted to expanding the handling capacities on these sections. But at the present time the handling capacity of the line that joins the Kuzbass with the Ural area and the Ural area with the center of the country is far from being fully utilized. Consequently, the Ministry Railways must concentrate attention on the development of stations and locomotives, eliminate the arrears in housing construction, complete the electrification of locomotion, and, within the shortest possible period of time, bring this mainline up to its planned capacity.

Under the current five-year plan second tracks are being constructed on a number of single-track sections in the Southern Siberian area. As a result, under the 12th Five-Year Plan the handling capacity of this area will increase 2 - 2.5-fold.

Pipeline transportation of petroleum and gas is being developed successfully in order to bring the raw material supplies of the eastern regions of the country into economic circulation. Six main gas pipelines will be constructed during the current five-year period, and the network of main petroleum pipelines will be expanded. The Urengoy-Pomary-Uzhgorod gas line was constructed almost twice as rapidly as was envisioned by the norms.

At the present time pipelines are used to move all of the gas that is extracted and about 94 percent of the petroleum, and the expenditures are one-half - two-fifths the amount for rail shipments. In 1980 cargo turnover with pipeline transportation reached 1,812 billion ton-kilometers or 52.7 percent of the cargo turnover on railroads. The proportion of pipeline transportation

will increase in the future since the extraction of gas is increasing in the northern regions of Tyumen Oblast. The network of petroleum product pipelines will be developed, and in the more distant future -- coal product transportation. The development of the transportation system with extensive utilization of pipelines will partially relieve the universal kinds of transportation of liquid and bulk cargoes.

In Western Siberia they are improving universal kinds of transportation which contribute to the assimilation of its petroleum and gas deposits. The creation of a transportation infrastructure in this region is a prerequisite for the extraction of petroleum and gas. Mechanized ports have been constructed on the Ob' and Irtysh, and the fleet has been significantly expanded. Shipments on the rivers have exceeded 16 million tons. The Tyumen-Surgut-Urengoy railroad has been constructed. Water transportation is beginning to be specialized (mainly for shipping construction materials and fuel) as is rail transportation (for shipping cargoes that require rapid delivery). The construction of paved highways to industrial facilities and along the routes of gas lines has been extensively developed. Their distance amounts to about 2,500 kilometers. It is very important that they have solved the problem of constructing capital highways under marshy and permafrost conditions. In all the large centers for extracting petroleum they have constructed airports which are capable of receiving aircraft of medium classes, which provides communications with practically all regions of the country. For shipping in cargoes, including heavy ones, they have created platforms on air cushions with lifting capacities of 40 and 60 tons. Devices based on the same principle are used for transporting heavy cargoes. The delivery through the marshes to the place of operation of a block compressor station weighing more than 300 tons showed the great possibilities of such transportation.

Of decisive significance for further advancing the economies of Central Asian and Transcaucasian union republics is the development of their transportation ties with industrial regions of Siberia, the Ural area and the center of the European part of the country. A large amount of work is also being done in this area. With the completion of this work the tension in the Central Asian area will be eliminated. The conditions for shipping agricultural products from the south to the north and coal from the north to the south will improve radically. Work is also being done to increase the handling capacity of rail transportation, which will make it possible to improve communications between Central Asia and the central and northern regions of the country, and will create prerequisites for close cooperation between Central Asian republics and other regions, as well as for specialization of branches of industry and agriculture. In particular there will be rapid transportation of fruits, vegetables and other agricultural crops into the regions of Siberia, the Ural area, Northern Kazakhstan and parts of the Volga area and the center of the country. A petroleum pipeline has been put into operation for sending petroleum to the Chimkent oil refinery, which has made it possible to essentially reduce transportation expenditures involved in providing Western Siberian petroleum for the republics of Central Asia.

A large amount of work is being done to develop transportation in the Transcaucasian republics. Transcaucasia will receive reliable automotive transportation ties with the European regions of the country.

A decision was made and construction is being planned for the Caucasian transshipment railroad, which will join the Transcaucasian republics with the central regions of the European part of the country. It would be difficult to overestimate the significance of this road for the further development of the Transcaucasian republics and their specialization. When the restructuring is complete there no longer be any limitations on the handling capacities of communications between the Transcaucasian republics and the central regions, and the distance of the shipments will decrease by almost 1,000 kilometers (it will no longer be necessary to send cargo through Baku). Conditions will be created for extensive use of rail transportation for passenger trips both to Transcaucasian regions and to the Black Sea coast.

Rail, water and automotive transportation will improve in the European regions of the country. A network of railroads is being developed for ties with the CEMA countries and for joining the central and southern regions. In spite of the existence of a relatively dense network railroads, their handling capacity has turned out to be inadequate in a number of sections. Therefore in many of them it is being increased primarily through construction of second tracks and transforming certain of the more heavily loaded sections, with comprehensive development of other elements of the economy, into two-track mainlines. The speed of passenger trains is increasing. A train intended for a speed of up to 200 kilometers per hour has been put into operation on the Moscow-Leningrad line. Tracks are being renovated in order to increase the speed of the trains on the Moscow-Brest, Moscow-Kiev, Moscow-Kazan, Moscow-Crimea and Moscow-Caucasus lines. In recent years on a number of lines the speed of passenger trains was reduced in order to create conditions for handling cargo stock. Now there is not only the task of restoring the speed, but also of increasing it, by expanding the sphere of efficient use of rail transportation instead of the more energy-intensive air transportation for trips with distances of up to 1,500-1,200 kilometers, that is, when using an airplane does not produce an appreciable savings of daylight hours enroute.

The unified deep-water river system of the European part of the Soviet Union continues to be improved. Filling the water reservoirs of the Cheboksarskaya and Nizhnekamskaya hydroelectric stations will make it possible to create a unified shipping depth of 4 meters on all the main cargo sections of the given water way, with an overall length of 6,300 kilometers. The volume of shipments through this system is increasing annually. On the middle part of the Volga it has reached 38 million tons a year. The Belomoro-Baltic canal is being renovated: wooden structures are being replaced with permanent ones. The Volgo-Baltic canal is also being renovated; a second channel of the Sheksninskiy locks is being created here. On the lower Don construction is being completed on the Konstantinskiy locks, which will make it possible to guarantee a depth of 4 meters up to the Ust-Donetsk port.

Ports and the fleet are developing in keeping with the increased cargo turnover, and special attention is being devoted to comprehensive

mechanization of loading and unloading work. The increasing volume of shipments is provided, as a rule, without increasing the number of people employed in these jobs. The problem of "river-sea" shipping is being solved successfully. At the present time cargo can be delivered from practically any large river port of the European part of the Soviet Union to any port on the European continent and Northern Africa. Mixed rail and water shipments are being developed. Calculations show that if one can send cargo 1,000-2,000 kilometers along the river, it is expedient to ship it with combined means of transportation. They make it possible to reduce outlays, to utilize the capacities of the river more completely, and to increase the volumes of delivery of cargo by rail transportation as a result of the rolling stock that is released.

A large amount of work is being done to develop sea ports and approaches to them. A container complex is being put into operation in the Riga port. Construction has been started on the Novotallinn sea port, which has a much greater capacity than the existing Tallinn port does. It will handle mainly specialized ships. It is intended to create a railroad ferry crossing between the USSR (Klaypeda) and the GDR (Sassnitz). The experience in operating a ferry crossing between the USSR (Ilichevsk) and Bulgaria (Varna) has shown how economical and highly reliable this kind of transportation is. During the current five-year period the Danube ports of Reni and Izmail are being expanded, as is the lighter base. The Yuzhnyy port, near Odessa, is developing. A specialized complex is being constructed for shipping coal and ores.

Highways are being constructed at rapid rates, and primarily in the agricultural regions of the country. During the past 20 years extremely significant success has been achieved in developing the network of highways and raising their technical level. During 1960-1983 the distance of general purpose paved roads increased from 271,000 to 761,000 kilometers. Moreover, they joined to the highway network 94.9 percent of the rayon centers, 94.7 of the urban-type villages and 86.6 percent of the central farmsteads of the kolkhozes and sovkhozes. But while the average indicators are favorable, a number of large cities and population points do not have entrances onto the main highway network. Among them are Arkhangelsk, Orenburg, Izhevsk, Syktyvkar and others, and also cities of Siberia and the Far East. It will be necessary to do a great deal to improve the permanent condition of pavements, bridges and other structures, and to increase the proportion of highways that allow traffic of motor vehicles with increased axle loads.

The measures that are being taken to improve construction, repair and maintenance of highways are exerting a positive influence both on the rates of their construction and on the quality and permanence. In order to create a highway network that completely satisfies the needs of the national economy and the population for shipments by automotive transportation, it is necessary to solve the following problems:

to provide all cities, urban-type villages and central farmsteads of kolkhozes and sovkhozes with at least one well-arranged entrance to the overall network of paved roads;

to create a network of statewide and republic highways that join together large cities and cultural and administrative centers of the country;

to bring the structure and technical condition of the network of paved highways in line with the intensiveness and composition of automotive traffic.

It will be necessary to renovate such highways as the Moscow - Simferopol 6- 8 lanes of traffic), Moscow - Minsk - Brest (4 - 6 lanes of traffic), Moscow - Arkhangelsk, Vologda - Arkhangelsk, and others.

Investigations of the dependency between the effectiveness of the organization of agricultural production and the living conditions of the rural population on the density and technical condition of the highway network, conducted by the Institute of Comprehensive Transportation Problems under the USSR Gosplan, show that an inadequate number of paved roads leads to significant losses of agricultural products, increased transportation expenditures, and other undesirable economic and social consequences. Just as a result of reducing losses, the time period for recouping capital investments in the construction of paved highways is approximately 3-4 years.

Without proper roads it is very difficult to provide for normal organization and technology of agricultural production, prompt delivery of fertilizers, observance of time periods for conducting agricultural work, and so forth. The kolkhozes and sovkhozes that are located 40-50 kilometers away from paved roads, as a rule, have economic indicators that are two-thirds - one-half those of similar farms which do have highways. These considerations determine the need for accelerated creation of highways in rural areas. The solution to this problem depends to a considerable degree on the attention given to road construction locally, initiative, and the desire to take advantage of all reserves and possibilities of accelerated development of the road network.

In certain regions of the country, for example, the Uzbek SSR, the Baltic republics and others, in the near future practically all the general-purpose roads will be paved. The matter of road construction is also arranged well in a number of krays and oblasts of the RSFSR -- Krasnoyarsk Kray, Novgorod and Saratov oblasts, the Mordovian ASSR, and others.

Further development of the USSR economy, concentration and specialization of production, accelerated involvement of the natural resources of the eastern regions in economic circulation, the development of integration processes among CEMA countries, improvement of the well-being of the workers, and, consequently, increased volumes of passenger transportation in the near future, set for the country's transportation system new and responsible tasks for providing the increasing volumes of transportation and improving its quality. These tasks must be carried out through extensive introduction of achievements of science and technology, which are directed primarily toward intensification of the utilization of existing fixed capital, improvement of the organization of operational work of individual kinds of transportation, and improvement of its management structure and interrelations with branches of the national economy. At the present time development is being completed on a long-term comprehensive program for the development of transportation,

whose recommendations, after approval, should become the main ones for the formation of a highly efficient transportation system for the country in the near and more distant future.

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CSO: 1829/88

## INTERSECTOR NETWORK DEVELOPMENT

### DEVELOPMENT OF TRANSPORTATION IN AGROINDUSTRIAL COMPLEX SUPPORT

Moscow PLANOVYE KHOZYAYSTVO in Russian No 12, Dec 83 pp 72-78

[Article by A. Chebotayev, doctor of technical sciences, senior scientific associate of the Institute of Complex Transportation Problems under the USSR Gosplan: "Tasks of Transportation Support for the Agro-Industrial Complex"]

[Text] Important directions for the development of agriculture are specialization and cooperation of agricultural production, the creation of agro-industrial complexes, and extensive application of industrial technologies in animal husbandry and crop growing. Transportation and economic ties are now very complicated (among 48,000 kolkhozes and sovkhozes, 10,000 interfarm enterprises and 500 agro-industrial associations, on the one hand, and service, machine building and procurement branches that serve the, on the other), and continuous work of transportation is becoming one of the major conditions for increasing the efficiency of the work of the APK. Therefore for transport machine building it is crucial to produce principally new shipping equipment which provides for increasing labor productivity and conducting agricultural work within the optimal agrotechnical time periods. Based on average annual norms for the per capita consumption of the main food products, presented in the USSR Food Program,\* and the growth of the population in the Soviet Union, we have calculated the volumes of shipments of the main food products, which are presented in the table (not counting the coefficient of repeat shipments).

Five kinds of transportation participate in providing service for the APK. One of the main kinds is automotive.

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\*See: "Prodovol'stvennaya programma SSSR na period do 1990 goda i mery po eye realizatsii. Materialy mayskogo Plenuma Ts K KPSS 1982 goda" [The USSR Food Program for the Period up to 1990 and Measures for Its Implementation. Materials of the May 1982 Plenum of the CPSU Central Committee," Moscow, Politizdat, 1982, p 11.

(in millions of tons)

Kinds of products	1980	1990
Grain products	36.5	38.4
Meat and meat products	15.3	19.9
Fish and fish products	4.7	5.4
Milk and dairy products	83.0	95.2
Sugar	11.6	12.9
Vegetable and melon crops	25.7	36.9
Fruits and berries	10.0	16.5
Potatoes	28.8	31.2
Vegetable oil	2.3	3.8
Eggs	4.1	4.9
Total	222.0	265.1

#### Automotive Transportation

Automotive transportation is used to ship two-thirds of all the volumes of agricultural cargoes. The automotive fleet carries out practically all technological operations in crop growing, beginning with the application of fertilizers and planting agricultural crops and ending with harvesting the crops. The role of motor vehicles is no less significant in animal husbandry.

Even under the 12th Five-Year Plan there will be the task of receiving products directly from agricultural enterprises everywhere and shipping them by automotive transportation from the kolkhozes and sovkhozes to the processing branches and those that procure live cattle and poultry, potatoes, milk, vegetables, berries and grapes.

Under the 11th and 12th Five-Year Plans there will be improved automotive equipment for the agro-industrial complex which provides better protection for the cargoes that are shipped and maximum mechanization of loading and unloading work.

The largest agricultural cargoes are the so-called bulk cargoes. They should be delivered and shipped without manual labor, that is, with minimum labor expenditures, which can be done with dump trucks. Even under the 11th Five-Year Plan the Ministry of the Automotive Industry should provide for the creation of capacities for producing 20,000 dump truck trains for agricultural purposes with a KAZ-4540 tractor. These so-called transport-technological truck trains are intended for diverting cargoes in the technological cycle of agricultural production.

A new means of transportation -- a truck train with increased cross-country ability -- can be moved at slow speeds along with harvesting equipment, the bed-platforms are adapted for loading from two sides, and they are suitable for shipping cargoes with various densities. The truck train can be joined to

fully power-driven KAZ-4540 tractor (with a wheel arrangement of 4 X 4) and a GKB-8535 model trailer with an overall useful load of 11 tons. At the same time the UAZ automotive plant is assimilating production of a fully power-driven dump truck (with a wheel arrangement of 6 X 6), with an annual output of 10,000. For more effective work in agricultural production, this tractor will be equipped with a GKB-8535 trailer, and, later on, a more modern GKB-8551 trailer with a cargo capacity of 7 tons. Thus the overall useful load of this truck train for agricultural purposes will be from 12.5 to 14 tons. The transport-technological truck trains will provide for the shipment of some of the agricultural products, whose harvesting takes place during the rainy fall period. We have begun the production of a new large-cargo dump truck train with ordinary cross-country ability for agricultural purposes, which consists of a KamAZ 55102 tractor with a cargo capacity of 7 tons and a GKB-8527 trailer for it with the same cargo capacity.

But in addition to the large-cargo transportation means that are used in agricultural and other subbranches of the agro-industrial complex, there is also a need for dump trucks with smaller capacities. Therefore an absolutely new diesel dump truck train is being created from a GAZ-SZA-4509 tractor and a GKB-8536 trailer; their overall useful load is 8-9 tons. In terms of the expenditure of light petroleum products it is 25 percent more economical than similar truck trains that are equipped with carburetor engines. As distinct from past periods, all the aforementioned dump truck trains will have mounted sides on the bed, which will facilitate effective shipment of agricultural cargoes with various densities, including hay and haylage.

Thus under the 11th and 12th Five-Year Plans the agro-industrial complex will receive new dump truck transportation whose useful load will exceed that of existing transportation 1.5 - 2.3-fold. The research that has been done shows that each percentage point of increase in the handling capacities of dump trucks makes it possible to increase the productivity of means of transportation by 1 percent and to reduce the cost of shipments by 0.71 percent. Consequently, augmenting the automotive fleet of the agro-industrial complex with new dump truck transportation will essentially increase the effectiveness of shipments of bulk agricultural cargo and will reduce the labor-intensiveness of their handling.

Additionally, one should point out a number of still unsolved problems, primarily the delay in the output of promising technical means -- removable (replaceable) dump truck beds. Their testing on KamAZ trucks in Novosibirsk Oblast during harvest produced positive results. For example, the productivity of grain shipment more than doubled when they were used. But in spite of the fact that there is a need for these systems not only in agriculture, but also in the food industry, construction, municipal services and other branches, these beds are not being produced. According to data of the Institute of Complex Transportation Problems (IKTP), the needs of the national economy in the near future for chassis for removable dump truck beds will amount to thousands.

Losses of agricultural cargoes during shipment are still quite significant. Preserving only 1 percent of the potatoes, fruits, vegetables and grapes that

are raised would provide for a savings of money which would make it possible to construct potato and vegetable storehouses with active ventilation with an overall capacity of 4 million tons.\*

It is possible to ensure complete preservation of perishable products by using refrigerated and heat-insulated vans, and also containers. The use of refrigeration equipment involves increasing the cost of automotive shipments by 30-40 percent, but then there is a significant savings of cargo, which amounts to an average of 10 rubles per ton. For early vegetables and fruits it reaches an average of 200 rubles per ton. The need of the national economy for this kind of transportation is satisfied by only 60 percent.

Taking into account the increasing demands of the national economy, the domestic automotive industry, for the first time under the 11th Five-Year Plan, will assimilate the production of highly effective large-cargo refrigerated semi-trailers, with capacities of 11.5 tons (Model OdAZ-9772) and 22 tons (model OdAZ-9786). The introduction of these refrigerated truck trains into operation will make it possible to increase labor productivity in shipments of perishable agricultural cargoes 1.5 - 2-fold.

An extremely important problem which has still not been completely solved is the introduction into practice of means of cooling shipped products in nitrogen and regulated gas environments (depleted of oxygen). As was shown by experimental research conducted by scientists of Moscow and Kharkov, the nitrogen cooling system in means of transportation has a number of advantages, particularly by retarding the biological processes in products, it retains their quality, this system is simpler to operate, it has a continuous cooling cycle, and, finally, liquid fuel is not required for its functioning. The main factors impeding extensive application of the nitrogen cooling system in transportation are the lack of nitrogen fueling and distribution stations, the relatively large expenditure of liquid nitrogen (300-400 kilograms per 1 ton of products), and also its high release price (4.2 kopecks for 1 kilogram).

Small enterprises of the food and meat and dairy industry, especially at the level of the rayon administrative unit, are very much in need of refrigerated and heat-insulated semi-trailer vans with capacities of 8-9 tons for the truck tractor of the ZIL type.

According to calculations of the IKTP, each year the national economy requires 12,400 refrigerated cars, including 5,000 for truck trains. At the same time the need for heat-insulated vans, including means of transportation with warming and semi-trailers, amounts to 27,000 units a year.

In our country 21 million tons of bread and bakery products are shipped in trays. And a large number of loaders at bakeries and salesmen in the stores are engaged in loading operations. A more effective means of shipping these cargoes is container delivery in vans, which provides for saving 30-40 kopecks per 1 ton of bread and eliminating manual labor on the part of the loaders.

\*See PLANOVYYE KHOZYAYSTVO, 1983, No 5, p 9.

Even now it is necessary to produce no less than one-third of the bread vans so that they are adaptable for container shipments. The automotive industry must reorient its production, taking into account the shipment of bread in Estonia and Moscow by the container method. Moreover it is necessary to modernize existing motorized vans for shipping poultry in containers.

The transportation of livestock has a number of specific peculiarities (losses of live weight, injuries, overwarming of the animals, and the need for care enroute). The necessary conditions can be observed most fully with the utilization of specialized rolling stock -- cattle cars. All world practice in shipping animals is following this path. The existing models of domestic semi-trailer cattle cars, OdAZ-857B and 857D, no longer satisfy the growing needs of the agro-industrial complex. It is necessary to have new high-quality technical equipment which provides, on the one hand, for safer shipment of the livestock and, on the other, greater capacity and, consequently, greater effectiveness of deliveries.

Testing has been done of modern aluminum single-axle semi-trailers for shipping livestock of the OdAZ-9976 model with a cargo capacity of 12 tons, which hold 66-81 head of hots, goats and sheep (weighing 100-130 kilograms each) or 32-37 head of cattle (weighing 350-450 kilograms each). As distinct from the old designs, the new cattle trailers have three sections, which will make it possible to reduce the injuries to the animals, especially when going around sharp curves, up and down hills, and also when braking. The ventilation in the new cattle car is more convenient than in the old ones, which has a favorable effect on the heat conditions in the car, especially during the summer. This larger-capacity cattle car with a KamAZ-5410 trailer has undergone testing at Ukrmyasomoltrans. These tests showed, for example, that replacing the OdAZ-857B cattle car with the OdAZ-9976 model makes it possible to reduce the cost of shipping cattle from 7.4 to 5.7 kopecks per ton-kilometer. Hence the effectiveness of the delivery of livestock in the new means of transportation has increased by 25 percent. Designs are being developed for two-axle cattle cars: the OdAZ-9977 and OdAZ-9958 models for fattening complexes.

A most important means of intensifying agricultural production is extensive utilization of organic and mineral fertilizers, which provide for up to a 50-60-percent increase in the yield. In 1985 26.5 million tons of mineral fertilizers will be applied, and in 1990 -- up to 30-32 million tons (translated to 100-percent nutritive substance content). In automotive transportation fertilizers are shipped both packaged and bulk. As world practice of shipping fertilizers shows, it costs one-third - one-fourth as much to ship them bulk as it does in packaging. Among the new means of transport intended for shipping toxic liquid compound fertilizers, one should include two varieties of the tank semi-trailers of the model GKB-9653 with a capacity of 9 tons and the GKB-9677 with a capacity of 13.5 tons. Their containers are made of glass plastic, which is more durable than steel with the aggressive environment of liquid compound fertilizers which are based on super phosphoric acid. In the future these means of transporting liquid compound fertilizers will be modernized, and it is intended to install pumps in them for pumping the liquids into stationary field containers.

At the present time we have developed and are testing, in combination with the KamAZ-5410 hydraulic truck tractor, a dump semi-trailer with a covered bed for bulk shipment of granulated mineral fertilizers and dustlike lime materials under the conditions of agricultural production. The dump semi-trailer is intended for shipping bulk fertilizers from chemical combines to station or remote warehouses. The use of these dump semi-trailers with the covered bed for shipping unpackaged mineral fertilizers should provide for complete elimination of losses of the cargo. Therefore their utilization will make it possible to produce a significant economic effect. The preliminary calculation of the effectiveness of bulk shipments of mineral fertilizers is from 2 to 3 rubles per ton of cargo. The same effect can be achieved with bulk shipment of mixed feeds or flour.

The increased procurements and consumption of milk that are earmarked for the future make it necessary to increase deliveries to the agro-industrial complex of large-cargo means of transportation intended for shipping products from assembly and cooling points to rayon and city dairies, and also back to the kolkhozes, sovkhozes and interfarm enterprises. For this purpose it is most expedient to use tank cars. Nobody has any doubt any longer about the need to replace 25- and 30-liter milk cans with tank trucks everywhere. Practice shows that this way losses of milk are reduced by almost 3 percent, its quality improves, and shipping costs decrease by 30-40 percent. New heat-insulated tank cars for KamAZ trucks have already been put into operation. The milk transports are in the form of truck trains: a trailer (model G6-OPA-15.5) with a capacity of 15,500 liters and a truck tractor (model RZ-ATsPT-11.5) with a capacity of 11,500 liters. With the use of these truck trains, labor productivity in delivering milk increases 1.8 - 2-fold. At the same time it should be noted that for the dairy industry it is necessary to develop designs of larger means of transportation with capacities of 20,000 - 25,000 liters for tractors of the MAZ type.

New semi-truck trains (models RZ-VTsP-6 and RZ-VTsP-11) with capacities of 6,000 and 11,000 liters have been put into operation. These semi-tank cars, like the milk cars, have heat-insulated beds with the insulation made of plastic foam, because of which the temperature of the product being shipped does not change by more than 2 degrees centigrade in 10 hours, with a difference between the internal and external air temperature of up to 30 degrees centigrade. They can be used efficiently for transporting beer. Its unloading is facilitated by the insignificant amount of excess pressure that is created by the carbon dioxide, that is, manual labor is completely eliminated.

Other varieties of tanks are also used for shipping cargoes of the agro-industrial complex. Production has been started on means of transportation for shipping anhydrous and aqueous ammonia (ZBA-2.6-130 truck and ZBA-2.6-817 trailer; ZIL-130V1 with MZhA-6 semi-trailer; ATsA-3, 85-53A truck), for shipping live fish ( -2.8 truck), and also for shipping liquid sugar (ACh-P990 semi-trailer). The shipment of liquid sugar, for example, in a specialized semi-trailer with a capacity of 12 tons pulled by a MAZ-5429 truck tractor makes it possible to obtain an effect of 5 ruble per 1 ton as compared to delivery in sacks.

The increased output of mixed feeds and chemical supplements for feeds makes it necessary to create new and better specialized means of transportation -- feed trucks. Feed trucks with screw conveyor unloading, model ZSK-10 on a ZIL-130 chassis, are already being produced, and new models of large-cargo means of transportation with pneumatic unloading are being tested. This is the model ASP-25 with a cargo capacity of 11,500 tons. The KamAZ-54101 is used as the truck tractor.

Among the problems of technical support of the agro-industrial complex that are still unsolved, one should include: the lack of large semi-trailer container movers with a capacity of 20 tons, which could be used throughout the road network; the shortage of large tank semi-trailers for shipping gasoline and diesel fuel; the existence of a small number of sideless low platforms for shipping assembled agricultural equipment, and trucks with or without sides with loading equipment -- cantilever or gantry cranes and cargo-lifting sides.

Because of the irregularity of shipments, whose peaks come in June, July, August and September, and the large list of agricultural cargoes, it would be expedient, in our opinion, to change the existing practice of delivering semi-trailers for truck tractors. Along with each truck tractor sent to agriculture it is necessary to provide two semi-trailers: one specialized, intended for shipping a particular cargo, and one with sides, for general purposes. To this end, it is necessary to increase correspondingly the capacities of the trailer construction plants of the USSR Ministry of the Automotive Industry.

The introduction of new, more effective and highly productive means of automotive transportation into the practice of agricultural production and of the agro-industrial complex as a whole fully corresponds to the requirements of providing automotive transportation for the country's APK. The USSR Food Program envisions: delivering to the kolkhozes, sovkhozes and enterprises of the food branches of industry 110,000 - 116,000 milk trucks, 50,000 - 53,000 cattle semi-trailers and 76,000 - 78,000 refrigerated trucks, and allotting 3 - 3.96 million trucks for agriculture during the decade.\*

Roads have no small amount of economic and social significance for increasing the effectiveness of agricultural production, since the cost of shipments on unpaved roads is 1.5-2 times greater than on paved roads. One should add to this that during the period of bad roads in the spring, the winter snow drifts and the prolonged autumn rains, unpaved roads become practically impassable within 40 days, and the shipments are made with tractors, which is 1.5-1.7 times more expensive than shipments with trucks. According to the calculations of economists, the national economy still sustains significant annual losses because of bad roads in rural areas. Therefore, in keeping with the USSR Food Program, during the next decade it is intended to construct

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\*See "USSR Food Program for the Period up to 1990 and Measures for Its Implementation," pp 52-53

approximately 130,000 kilometers of general purpose highways in rural areas and 150,000 kilometers of paved intrafarm roads. In order to accelerate the construction of rural roads, it is expedient to use the fund of all the enterprises that are partners in the agro-industrial complex.

#### Rail Transportation

Shipments of agricultural cargoes by rail transportation involve smaller labor, energy and other expenditures than automotive transportation. Therefore, rail transportation is used for shipping agricultural cargoes over long distances. At the present time they amount to 376 million tons, or about 10 percent of the overall volume of agricultural cargoes of the agro-industrial complex.

Railroad cars must provide the greatest preservation of the products of the agro-industrial complex that are shipped, with a maximum level of mechanization of loading and unloading work. Covered cars, semi-cars, platforms, tank cars and refrigerated cars have been used extensively. But this fleet of vehicles is still inadequate for provided transportation for the agro-industrial complex, and it is necessary to augment the fleet with new and specialized cars.

This pertains to a considerable degree to grain shipments, which are not uniform throughout the course of the year: during harvest time they increase by 30-35 percent over the average annual level. At the present time mainly closed cars are used for shipping grain. They can hold 106 and 120 cubic meters and they are equipped with sealing boards. Losses amount to 1-1.5 percent. The Ministry of Heavy Machine Building has already assimilated production of modern specialized four-axle hopper cars for shipping grain. The capacity of their beds is 93 cubic meters, and the weight capacity -- 65 tons. They plan series production of modernized four-axle covered hopper grain cars with a weight capacity of 68 tons. The use of self-unloading grain hopper cars for shipping grain with the appropriate moisture content (no more than 20 percent) makes it possible to preserve all of the cargo that is shipped and to eliminate less effective manual labor in loading and cleaning. Our calculations show that with the introduction of specialized grain cars there will be an increase in the cost of shipments of 4-5 percent as compared to the unadapted means of transportation, but then, as a result of preservation of the cargo, there will be a national economic effect of up to 2 rubles per ton or 200,000 rubles (with a price of 200 rubles per 1 ton) for each million tons of grain that is delivered to grain receiving points over a distance of 800 kilometers. Thus the increased cost of transportation services is covered by the increased effectiveness of the work of enterprises of the USSR Ministry of Procurements and the USSR Ministry of the Food Industry. The utilization of specialized new grain cars in trains and the creation of reserves of empty cars, if necessary, at the main cargo forming points are also related to the need for modernization of existing grain-receiving warehouse points of the USSR Ministry of Procurements and increasing the productivity of receiving points to 300-400 tons per hour. Moreover, the USSR Ministry of Procurements must also consider the question of breaking up the grain receiving points of mixed feed plants and beginning to construct

them as close as possible to the places of production, which is especially important for the remote regions of Kazakhstan, the Volga area and Siberia. It is expedient to adhere to the same principle when locating vegetable storage facilities of the USSR Ministry of the Fruit and Vegetable Industry and the USSR Ministry of Agriculture. This will reduce the demand for rolling stock which is in short supply, and will considerably reduce the distance and the deadhead shipments of grain (which now amount to 25-30 percent), vegetables and fruits.

At the present time rail transportation is used to ship more than 120 million tons of mineral fertilizers. Their delivery on time, with minimal quantitative and qualitative losses, significantly influences the productivity of the fields. The replacement of package shipment of granulated mineral fertilizers in ordinary covered cars with bulk shipment in specialized self-unloading car-hoppers will provide for an annual effect of up to 40,000 rubles per one piece of transportation equipment. We are already using modern mineral cars with weight capacities of 64 tons and volume capacities of 73 cubic meters. It is expected that the Ministry of Heavy Machine Building will assimilate modern car-hoppers more rapidly for shipping larger loads (up to 68 tons) of granulated mineral fertilizers.

From the standpoint of transportation and technical supply, the most complicated is the shipment on the railroad of perishable cargoes in refrigerated cars using cooled air, a regulated gas environment, dry and regular ice, and so forth. Now only half of the perishables are shipped in these refrigerated cars.

In order to find a radical solution to this problem, it is intended to augment the railcar fleet with new refrigerated and heat-insulated cars. Thus as early as 1984 we shall begin series production of an autonomous refrigerated four-axle car (ARV) with the progressive "sandwich" heat-insulating design and a capacity of 47 tons. Similar five-car refrigerated sections (with cargo capacities of the four-axle car of 46 tons) from the GDR. At the beginning of the 12th Five-Year Plan it is intended to augment the fleet of cars with new heat-insulated cars that are less expensive to use -- "thermoses" for milk, wine and other liquid products with a capacity of 53 tons, and also "iceberg" cars with ceiling vats that hold 37 tons. Augmenting the fleet of railroad cars with the aforementioned means of transportation fully corresponds to the tasks of the USSR Food Program, where it is written: "In heavy and transport machine building, to create capacities for increasing the production of self-unloading cars and specialized tank cars for shipping mineral fertilizers and lime materials to 6,000-7,000 cars (tank cars) per year and heat-insulated refrigerated cars to 2,000 per year."\* Prompt implementation of these measures will make it possible to improve the service for the branches of the agro-industrial complex with railroad rolling stock.

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\*"The USSR Food Program for the Period Up To 1990 and Measures for Its Implementation," p 54.

One of the means of increasing the effectiveness of rail shipments of cargo for the agro-industrial complex is to transfer shipments over short distances (50-100 kilometers) from rail to automotive transportation, since in these case the productivity of the car decreases to one-tenth the average for the network. The effectiveness of automotive shipments is high because of the accelerated delivery of the cargo and the elimination of transshipment operations from the truck to the railcar to the truck.

#### Water Transportation

The cost of shipping cargo on river transportation is 25-33 percent less than on railroads. The role of river transportation is especially great in the Volga basin and Siberia. Each year thousands of tons of water melons, other melons, tomatoes and so forth are shipped from the Lower Volga, that is, from Astrakhan and Volgograd oblasts to Moscow, Gorkiy and other large cities.

In keeping with the Food Program, the RSFSR Ministry of the Ship Building Industry and Ministry of the River Fleet, in 1983-1990 must provide for the construction of 90 river vegetable transport ships. In 1983 they will test the first vegetable ship, which is capable of hauling 600 tons of tomatoes or 1,300 tons of water melons and other melons. In order to ensure the preservation of the product that are shipped, refrigeration equipment will be installed on the ship (from the GDR), which can cool the air to +7 degrees centigrade. The effectiveness of the operation of the vegetable ship is achieved as a result of the increased preservation of the products and, as calculations show, will amount to 20 rubles per ton. In order to raise the level of loading and unloading work, it is intended to ship vegetables and melon crops in specialized collapsible containers, which will make it possible to reduce the time periods for their delivery from the regions of the Lower Volga to industrial centers of the country, while preserving the high quality of these food products.

In June 1981 the river fleet began to be augmented with imported refrigerated ships of a new type: "Refrizherator-601" (design No 037), which are constructed by the Rosslau shipyard (GDR).\* A ship of the class M-PR (led) is intended for shipping many kinds of perishable cargoes: meat and fish, dairy products, and fruits and vegetables. The preservation of the cargoes that are shipped is provided by the fact that the ship has a double bottom with insulation made of polyurethane foam and double sides with insulation made of plastic foam, which make it possible to maintain the proper temperature conditions in the holds. The temperature in them is reduced from + 24 degrees centigrade to - 18 degrees centigrade for 13 hours. The refrigerators will ship perishable cargoes in Siberia, and this is why they are assigned to the Lena river ship association.

The maritime fleet is less involved in the problem of technical support for the USSR Food Program. But it is irreplaceable for importing foods. In 1981 alone the maritime fleet delivered more than 1 million tons of fresh fruits,

\*See: RECHNOY TRANSPORT, 1982, No 1, pp 33-34

980,000 tons of meat, and 213,000 tons of vegetables. In 1974 the Soviet maritime trade fleet began to be augmented with larger refrigerated ships of the Aleksandr Kollontay type (displacement -- 7,430 cubic meters, speed -- 22 knots per hour). The new refrigerated ship of the Nikolay Kopernik type is used for shipping bananas and other tropical fruits. Other ships of the Chapayev, Aragva and other types are also used.

The utilization of large-cargo refrigerated containers is extremely promising for shipping perishable products on maritime transportation. As a result of these, the cost of shipping 1 ton of products with the container method "from door to door" decreases by 30-40 percent, expenditures on warehouses decrease, the products are preserved better, and the number of port workers employed in loading and unloading work decreases to one-ninth the ordinary number.

In maritime transportation, in order to provide more fully for shipments of food cargoes, specialized complexes for transshipment of these cargoes will be created in ports of the Baltic, Black Sea and Far Eastern basins.

#### Air Transportation

Each year air transportation is used to ship more than 100,000 tons of perishable products. By 1985 these shipments will have increased by 20 percent, especially to remote regions. A most important feature of modern cargo civil aviation, which is intended for shipping various kinds of cargoes, including cargoes of the agro-industrial complex, is the introduction of the Il-76T aircraft with a cargo capacity of 40 tons and another aircraft. Both aircraft are used extremely effectively for shipping containers. In order to raise the level of mechanization of loading and unloading work, the Il-76T is equipped with four electric telfers and control rails. The ground mechanization includes four roller conveyors, sections (collapsible) for fastening standard aircraft containers, and also two loading cranes which can lift 3 tons. The latter are intended for loading agricultural and other technical equipment weighing up to 20 tons. The design of the high-clearance chassis is intended for regular operation of the aircraft on grass airfields. The utilization of modern aircraft for air transportation will make it possible to increase the volumes of shipments of fresh vegetables and fruits, primarily to the remote regions of Siberia and the Far North.

Moreover, under the 11th Five-Year Plan, the new specialized M-15 agricultural aircraft already went into operation. It replaced the An-2. The productivity of the work of the M-15 aircraft, which takes off from grass airfields, is 70 percent higher than that of the An-2, and the quality of the application of mineral fertilizers, herbicides and other chemicals is better. Mi-2, Mi-8 and Ka-26 helicopters will also be used for these purposes. There will be more planting from the air of rice, wheat, barley and so forth. Cargo modifications of the Il-18 and Tu-154 aircraft will appear.

#### Pipeline Transportation

The utilization of pipeline transportation for delivering agricultural products has not yet passed through the experimental stage, although in a

number of cases it can be used effectively, for example, when delivering milk from the farms to the dairies. The transportation of milk along an underground dairy product pipeline with a distance of 6.2 kilometers made of polyethylene between the Rodina Kolkhoz and the Uglich butter and cheese plant in Yaroslav Oblast produces a savings of 5 rubles per ton. It is expedient to develop this kind of transportation.

The solution to the transportation and technical problems for the implementation of the USSR Food Program will make it possible, in the final analysis, to increase the effectiveness of agricultural production and eliminate interruptions in the supply of certain food products to the population. Planning and supply agencies should reach a point where all assignments for transportation support of the agro-industrial complex are fulfilled.

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## INTERSECTOR NETWORK DEVELOPMENT

### EFFORTS TO INTEGRATE, COORDINATE TRANSPORT IN UKRAINIAN SSR

Moscow PRAVDA in Russian 30 Aug 83 p 2

[Article by K. Masik, deputy chairman, UkSSR Council of Ministers: "Cooperation, Organize Operations Efficiently"]

[Text] The decisions on economic and social tasks adopted by the 26th Congress of the CPSU lay great stress upon the increasing role and importance of transportation as one of the key sectors of the country's economy. The November (1982) and June (1983) plenums of the CPSU Central Committee have also devoted a great deal of attention to the problem of improving the functioning of this sector.

Although the Ukraine is fulfilling its annual plans for freight deliveries, its transport ministries and departments are frequently found to be directing the activities of subordinate organizations in isolation from one another, concerning themselves primarily with their "own" ministerial performance figures, which do not always coincide with the interests of the national economy as a whole.

In view of this state of affairs, the republic has decided to undertake a carefully planned effort to upgrade the functioning of its transportation system, to shift some cargo-carrying responsibilities from the railroads to motor, riverine and pipeline transportation systems, in a word, to take all steps necessary to increase the effectiveness with which we utilize the republic's transportation network. A republic-level interdepartmental commission has been added to the Ukraine's Gosplan to coordinate efforts to reduce inefficient runs.

One result which has already been achieved has been a sharp reduction in the number of shipments of such high-volume republic production as rubble rock, for example, moving in opposite directions. This product is produced by more than 300 enterprises subordinate to over 33 ministries and departments in volumes in the neighborhood of 255 million tons a year. This material has been being shipped in inefficient patterns along routes which frequently run counter to one another. The situation has now taken a turn for the better: in the process of establishing patterns of production relationships, UkSSR Gosplan is now providing for annual barter transactions in volumes exceeding 5 million tons.

Proposed plans are calling for future construction materials production to be concentrated in eight ministries and departments. This will make it possible to achieve substantial improvement in the organization and efficiency of our transportation system and at the same time reduce freight turnover almost 15 per cent.

We will also be seeing improvement in our transportation of beets, sugar, precast reinforced concrete and components to be provided on a cooperative basis. The republic's Gossnab has developed a more efficient transportation system, under which enterprises are more efficiently linked to production facilities and vendors.

Freight moving responsibilities are also being shifted to other modes of transport. Each year sees over a million tons transferred from the railroads to motor vehicle transport, while the rivers are taking on as much as 2 million tons. These and a number of other measures have made it possible over the past three years to achieve substantial reductions in the numbers of nonproductive hauls.

These steps have not, of course, exhausted all possibilities of making our transportation system more efficient. Efforts to rationalize are occasionally frustrated by differences in organizational policy, which include deficiencies in the system of freight rates: our shippers are still inclined to move their freight, just as they have always been, by rail—the least expensive mode of transportation here. But when the contents of a car are transferred to a truck or means of riverine transport, the consignor suffers because he then has to pay the difference in rates for the two modes of transportation.

For a long time now, the Cherkassy "Azot" Production Association has been shipping mineral fertilizer by rail to seaports for export. Elementary calculation, however, as well as a trial experiment have confirmed the view that it would be more advantageous to ship the fertilizer to port by riverine transport for subsequent transshipment onto the seagoing ships. Delays in the resolution of questions concerning product packaging are nevertheless frustrating efforts to make this change. All this despite the obviously great advantage to be derived from it: besides substantially reducing the demand for rolling stock, it would sharply increase the productivity of the labor involved and eliminate manual operations entirely. This question has repeatedly been raised before the Ministry of Fertilizer and the Ministry of Foreign Trade, but efforts to resolve it have progressed only slowly, while proposed solutions do not go far enough.

Questions concerning interaction and cooperation between different modes of transportation at points of interface between them are objects of continuous attention. The Odessa transportation region provides a good example. The dockers and rail workers here have been the first in the country to begin to develop unified operational procedures at the lower organizational levels. We are now seeing increasingly extensive integrated competition between allied transport workers at the level of the steamship organization, railroad, motor freight-shipping administration, coordinating council or group and integrated dispatching shift. Councils of party organization secretaries are intensifying their efforts as well. The workers at Il'ichevsk have been among the first in the country to adopt the practice, endorsed by the CPSU Central Committee, of developing a single operational process on the basis of a continuous operational schedule for the terminal as a whole.

In enlarging and working to improve upon the Odessa experience, we will be trying to introduce the integrated freight handling system everywhere. Republic, oblast, city and rayon operational groups and headquarters have been organized, and we are now seeing meetings regularly called to discuss operational problems. Those attending the most recent of these meetings learned, among other things, that as a result of the implementation of decisions made earlier, food shipments processed

through our seaports are up 1.5 times over the figure for 1980, while the rate at which Black Sea Shipping Line vessels are being handled has increased by more than one-third.

Ships which have both river- and sea-going capabilities have made their appearance on the Dnieper only relatively recently, but as early as this past year this fleet handled almost one-third of the Ukraine's entire riverine freight turnover, to include the 1.53 million tons moved without transshipment in estuarine seaports. This has cut transport costs enormously.

Also worthy of our attention, I think, is Kiev's experience with cooperative utilization of riverine port capacities with the objective of assisting rail freight liners in processing their cargos during the period between navigation seasons when the fleet has less to do. This initiative would without doubt be being adopted much more rapidly if it were supported with the appropriate standards documentation by our planning authorities.

We believe it is necessary to upgrade the system by which we support our enterprises and organizations by offering them an entire range of services. Centralized deliveries had already last year accounted for 91.6 per cent of the total volume provided by the UkrSSR Ministry of Motor Transport. Deliveries of coal, road-building materials, sugar beets, grain and other freight have now been fully centralized. Efforts to introduce the optimum pattern of rail car-to-truck and ship-to-truck shipments are being frustrated by shortages of covered semitrailers, container carriers and other specialized equipment.

One of the painfully difficult problems confronting us is the lack of coordination in the republic's industrial transport system. You have to agree that it cannot be considered a normal situation when the condition of the approach track at a number of our sugar industry enterprises is such that cars can be moved at speeds no greater than 10 kilometers per hour and when half of the locomotives stand idle due to malfunctions awaiting repairs. And would the situation also be viewed as normal when not a single ruble was allocated to the UkrSSR Ministry of the Fruit and Vegetable Industry in 1982 for the development of its industrial transportation system? The fact is that its cars waiting to be unloaded, particularly during the period of large-scale shipments of agricultural products, stand idle 1.5-2 times longer than normal. We find the same situation existing in a number of other industries as well. It is our view that this is a direct consequence of the lack of coordination prevailing in the industrial rail transport sector and of the inadequate attention given it by our planning authorities. The integrated program of industrial rail transport development for the current five-year plan has yet to be approved.

It is entirely obvious from the best experience available that a change from mutual claims and grievances to mutual assistance is what constitutes the basis for effective, businesslike collaboration among transport people. This is what will achieve high performance figures. Implementation of the recently approved CPSU Central Committee and USSR Council of Ministers decree "Improvement of the Planning and Organization of Industrial Freight and Passenger Transportation and Intensifying the Effect of the Economic Mechanism upon Efforts to Increase the Efficiency of Transportation Enterprise and Organization Operations" can without doubt be counted upon to improve the situation. I think what we have to do first

is to monitor our operational discipline more closely, particularly on the railroads. For the fact is that we are still seeing trains frequently delayed at junctions between divisions and roads as well as at station entry signals. We see this, for example, as being responsible on the Southern Railroad alone last year for the loss of 50,000 train-hours and the delay of almost 44,000 trains for more than 10,000 hours at station entry signals.

The L'vov Railroad launched an initiative five years ago with the objective of insuring more efficient utilization of our means of transportation. This initiative, subsequently endorsed by the CPSU Central Committee, calls for the assumption of mutual responsibility for accelerating the rate of car turnover and provides incentives for meeting processing requirements ahead of schedule—additional freight handling resources will be allocated to those enterprises which have been able to economize in their use.

The Ministry of Railroads is now having other organizations, too, adopt the L'vov practice, but it is not creating the conditions necessary for the fulfillment of mutual obligations. In consequence of the imbalance between the technical measures and the transport plans submitted by customers, however, the L'vov Railroad itself has yet to see this initiative yield the desired results.

In overcoming the barriers of blinkered bureaucratic parochialism, the way the transport workers of the Ukraine have begun to cooperate has demonstrated in deed the high degree of efficiency to be achieved through implementation of an integrated approach to the improvement of operations on our trunk and approach lines and in our ports and motor transport organizations. With a view to arriving at an effective solution of the "interface" problem, republic organizations have undertaken to implement a long-term integrated program whose objective is to insure the efficient organization of operational cooperation between our railroads and our motor and other modes of transportation. Implementation of this program will make it possible to increase the operational efficiency of each component of the transport conveyor and to improve cooperation between the transportation and other branches of our national economy.

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## INTERSECTOR NETWORK DEVELOPMENT

### NEED FOR HIGHWAY NETWORK IN BAM ZONE

Moscow IZVESTIYA in Russian 30 Aug 83 p 1

[Article by A. Kin, Candidate of economic sciences; scientific secretary, USSR Academy of Sciences scientific council on BAM problems, and IZVESTIYA correspondent A. Kleva: "A Highway along the BAM, Essential for the Economic Development of Adjacent Regions, On the Ministerial and Departmental Agenda"]

[Text] Next year will see the Baykal-Amur Mainline opened to operational traffic. After all sections of the line are turned over for full-time operation, the USSR Ministry of Transport Construction plans to write off its balance the temporary road that runs along it, which cost more than 218 million rubles to build.

These 3224 kilometers of roadway running through the taiga have permitted our transport construction workers to employ their modern equipment all along the line and to accelerate the pace of construction. This very same road is now helping us create the bases of the future infrastructure in this uninhabited region.

It's been over four years now (January 1979) since IZVESTIYA published a letter from a deputy of the Severomuysk settlement Council of People's Deputies, A. Grigorash, under the heading "It's Costing Us a Lot Not to Have Roads." The author called attention to the fact that the temporary road along the BAM really didn't belong to anybody: "The BAM road must live beyond the time when the railroad itself goes into service. For the fact is that it will provide a foundation we can build on for the future; we can run other roads from it to mineral deposits along the BAM, to new settlements, new enterprises.... The time to begin work on these new roads is right now, while the major construction organizations are still out here with all their sophisticated equipment...."

But alas, nobody has paid any attention to this solid advice. The BAM road was built haphazardly with major deviations from the original design specifications; it has only a thin bed; there's no hard surface, and the original estimates and design have been continually modified. Nobody seems to know where the estimate that only a few hundred trucks would be using this temporary road every hour actually came from. In the meantime, however, truck traffic here has been almost six times as heavy as originally estimated. The result has been that in a number of places the BAM road has broken up under the load and become difficult to negotiate.

The poor condition of the road has already been responsible for the breakdown of many trucks, for declines in their coefficients of utilization and for accidents. We travelled the BAM road this past spring as part of a joint group comprising members of the USSR Academy of Sciences' Scientific Council on Problems of the BAM. Meetings with experts, many years of personal observation—all this has permitted us to draw the following conclusion. What we are seeing in Siberia is the bad practice of simply writing off, or, more accurately, abandoning, roads after the railroads are built. Only as the region grows and develops are we beginning to restore what has become virtually useless because of poor management.

Analysis of practical experience accumulated in the operation of the Transbaykal Railroad, this most difficult, 1500-kilometer-long, section of the Transsiberian Railroad, shows that a parallel road is simply indispensable. Because of the absence of such a road in the Baykal Region, the preventive and other maintenance and repairs done on the railroad in the summer require throughput on the line to be cut for a part of each day. Experts have calculated that if they used trucks, our brigades could cut work time some 40 per cent, principally because it would take only one worker to maintain a kilometer of track. Rail-borne repair brigades, however, are less mobile, and this system requires two workers. The simplest of arithmetic shows that this would require at least 6500 workers to service the BAM. This makes for a rather serious problem in a sparsely populated region.

We also have to keep in mind the fact that mud flows, floods and icing are all possible along the BAM. So we can see deformations of the line itself as well as breaks in the power transmission lines. A road would make it possible to transport repair personnel to a work site quickly even if the railroad had been put out of service. We have only to recall the extensive flooding back in 1972, when the Transsiberian was able to deal with the aftermath of this rampage by the elements quickly where there were roads paralleling the line. It was precisely on the Transbaykal Railroad that the situation was worst—a long, drawn-out bottleneck developed here....

Economists have calculated that by 1990 the Transsiberian is going to be transferring many millions of tons of industrial freight to the BAM each year. If we continue to perform our preventive maintenance and repairs as we have in the past, the BAM is going to be responsible for substantial declines in throughput.

And then, finally, the most important consideration. A road will constitute the basis of a strategy for populating this region and establishing a settled work-force here. There is no large-scale industry in the BAM region yet, but it is already home to some 1 million people. The number of new settlers is going to increase sharply in time. For the fact is that large-scale logging operations and sovkhozes are being established out here and the foundations being laid for the construction of an exceptionally important complex of facilities, which will be engaged in the exploitation of the Udkanskiy copper fields and the Molodezhnyy textile asbestos deposits as well as of a hydroelectric power plant on the Vitim. None of these plans will become reality, however, if we don't have access to and from the railroad.

So the point is that this road is going to have serve as the main artery feeding the economic development of the enormous territory here.

Now how are we to solve these problems? If the transport construction people write the BAM road off their own balance and nobody is going to take over responsibility for maintaining it, within three years we're going to see it become incapable of accommodating any traffic. To then restore the road in the future will require substantial one-time expenditures. We will have to reestablish a production base and reassemble the construction organizations. Clearly a wasteful, uneconomic alternative.

Practical experience, however, suggests another solution. The RSFSR Ministry of Highways should take over the administration of the BAM road, while the krays and oblasts it runs through should even now be assuming responsibility for maintaining it proper condition and improving it to the extent to be desired. There are already examples of this kind of arrangement. A formal transfer of the existing sections of the road to the RSFSR Ministry of Highways by itself, however, is not enough—the efforts of the ministry will have to be supported by precisely those GlavBAMstroy organizations which built the road in the first place and are still working on it. And it might be added that GlavBAMstroy is prepared to take on this responsibility, but what are needed first are a customer and, of course, financing.

It is to be hoped that the questions we have been discussion will be properly studied and analyzed. If we are to do things properly, we should, in our view, begin to plan roads like this (just as we do our railroads) as permanent, not temporary, arteries. This should particularly be the case when we're talking about Siberia.

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## INTERSECTOR NETWORK DEVELOPMENT

### MORE EFFICIENT INTEGRATION OF RAIL, RIVER TRANSPORT URGED

Moscow PRAVDA in Russian 8 Sep 83 p 2

[Article by A. Baritko, chief, department of combined-mode transport planning, Ministry of Railroads, and O. Tatevosyan, economist: "Transshipment, Transport—a Key Industry"]

[Text] Combined-mode rail-water through transport.... Terminological accuracy must surely have been the last thing on the mind of whoever it was who concocted this designation. For indeed, can we really refer, for example, to the delivery of ore from the Kursk Magnetic Anomaly [KMA] to metallurgical enterprises in the Urals via the riverine port of Ust'-Donets as "direct traffic?" Each year sees 400,000 tons of ore loaded into railroad cars, moved almost 1000 kilometers south, where it lies at a moorage on the river, and then loaded onto ships and sent by water northeast to the port of Perm' on the Kama. Pointlessly hauled almost 2000 extra kilometers!

But this isn't all. Ore from the KMA then travels on beyond Perm' to Magnitogorsk, Nizhniy Tagil, Chelyabinsk....

So what we have here is not through, but rather something more accurately referred to as "roundabout" traffic. The experts who devised such an involved transport pattern justify it by pointing to the fact that it frees up rail freight throughput capacities. But this, alas, is by no means always the case. Trains with empty cars will frequently be found making their way up the Volga and Kama on lines paralleling the route taken by the ships. They have been dispatched to take on coal at fields in the east. Ore at the river port in Perm', among other places. They just could be the very same cars which have been unloaded at the docks of Ust'-Donets!

This is doing substantial harm to our rail transport system. It would appear that the river transport people involved in this through rail-river traffic are rendering their colleagues some valuable assistance—after all, they are carrying the load part of the way themselves. Upon closer examination, however, it can be seen that this really isn't any advantage at all. For the fact is that it takes a lot of time to dispatch cars to port twice (to Ust'-Donets loaded and empty to Perm'). Time for switching and classification, time for making up the trains, time for sending cars to the loading area and then returning them... The length of time required for these procedures would be entirely comparable with the time it would take a freight train to travel a distance equal to the distance over water included in many multi-mode movements involving two transshipments.

How did such an inefficient transportation pattern ever come to see the light of day? Over 10 years ago now, the Ministry of Railroads agreed with conclusions presented by the interested parties involved here, the transportation department of USSR Gosplan and the RSFSR Ministry of the River Fleet, that the system being proposed would make it possible to economize in the use of a large number of rail cars and in some places free up throughput capacities on a number of rail freight lines. Judging by everything we see, however, nobody then was doing any thorough economic calculation and analysis. It now turns out that the roughly 100 freight "consignments" involving these two transshipments and volumes totaling more than 20 million tons are negatively impacting the national economy to the tune of tens of millions of rubles. The worst thing about it is that this "double transshipment" system requires over 2000 more cars every day than a through pattern of rail shipment alone.

These double transshipments are also detrimental to the health of the national economy. Here are some concrete statistics on the above-mentioned system involving the movement of ore from the KMA to the Urals via river ports at Ust'-Donets and Perm'. This pattern requires an extra 150 gondolas for each day of operation, several dozen skilled workers and substantially increased amounts of working capital diverted from material production.

If we simply did away with this system of double transshipments and let the railroad handle this freight, this alone would be enough, generally speaking, to make available to the national economy each year tens of millions more rubles in income and 2000 more rail cars, all, as they say, for nothing, enormous amounts of electric power, machinery, fleet capacities.... This plus the fact that this freight would be moving primarily on the European railroads, where there are no problems involving throughput or carrying capacity which cannot be solved. Strange as it may seem, however, there are many who oppose this effective, businesslike approach to the problem.

Their argument is that you would be taking tens of millions of tons of freight away from the river fleet...and then replacing them with what? For here, they say, we have created, equipped and brought on line the capacities to do this job, capacities in dock facilities, machinery, ships.... They have to have work to do, they have to be able to make their contribution to the national economy. They can't be allowed simply to stand idle. Otherwise the river fleet's performance figures would plummet.

Not long ago the Ministry of Railroads approached the transportation department of USSR Gosplan and the interdepartmental transport rationalization commission with a proposal to do away with double-transshipment movements and then increase through shipments by riverine transport or shipments involving only a single transshipment.

Some freight owners immediately recognized the benefits to be derived from these proposals. The USSR Ministry of the Automotive Industry, for example, has seen it to be to advantage to ship part of its vehicles, and precisely that part which has to be "self-delivered," as they say, to consignees because there aren't enough rail platforms, to send part of its vehicles by ship from the Kama Truck Works to the port at Ust'-Donets, where consignees in the immediate vicinity would then pick them up. With this objective in view, the vendor would be prepared to build a storage area in Ust'-Donets for vehicles arriving by river ship and then to set up a small branch of its sales department there. Metallurgists have also come to

take an understanding view of these suggestions. They, too, are looking for ways to increase the volumes they ship by river transport without participation of the railroad. But so far, things haven't progressed past the agreement stage.

Freight owners, however, really don't prefer river transport. Why? Because freight shipped on the river has, for the most part, to be handled at general-purpose port facilities. Only rarely will you see any dock facilities even at enterprises located right on the banks of our navigable rivers. Those there are are not being put to the most effective use. Here are some examples of what we are talking about by way of confirmation. The sites for the construction of such industrial giants as the Volga and Kama Motor Works were selected, as we know, with an eye to the transport possibilities they offered, among other things because of the availability of water transportation at these locations. But now how is this potential being exploited? Only low-capacity dock facilities and the customary reliance upon rail transport—that's what we see here today. Even such large and well-established facilities as the Gor'kiy Motor Works, the Yaroslavl' Tire Plant and other enterprises whose receiving operations depend upon deep-water river transport have virtually no docks of their own.

So it turns out that the river fleet is living, as it were, off the railroad. And things get curioser. Coal is being delivered to Moscow's TETs-22 via the Moscow River to the Southern Port...past, that is, the consignee. The fuel is then shipped from the port through the entire city by rail.

The problem here is clearly one of the orientation of our river fleet. Where we need to be developing enterprise dock facilities we are building more and more new general-purpose ports (at Vazhiny on the Svir', for example). But then where the need for greater general-purpose port capacities is really acute (are we are referring here, of course, above all to our Siberian ports, Osetrova on the Lena, for example), there hasn't been any progress for decades, in consequence of which thousands of cars stand idle at the approaches to a port.

We believe that the transportation department of USSR Gosplan and, yes, USSR Gos-snab as well, should be working more deliberately to reduce the volumes of inefficient, multimode freight movements involving many intermediate transshipments and, wherever possible, orient the river transport people in the direction of providing more independent freight service to consignors and consignees without participation on the part of other modes of transportation. Particularly what with the fact that the CPSU Central Committee and USSR Council of Ministers decree on improving the functioning of the economic mechanism in the transportation industry has charged the planning and supply authorities with the task of continuously monitoring our national economic transport expenditures and with working consistently to reduce them.

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